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SAN JOSÉ/SANTA CLARA WATER POLLUTION CONTROL PLANT/ POND A18 MASTER PLANNING

PLANT LANDS OPPORTUNITIES AND CONSTRAINTS ASSESSMENT

FINAL

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TABLE OF CONTENTS

FIGURES

TABLES:

APPENDIX:

EXECUTIVE SUMMARY

The City of San José (City) is in the early stages of developing a comprehensive Land-Use Master Plan for the San José/Santa Clara Water Pollution Control Plant (Plant) lands, including Pond A18. The Land-Use Master Plan will identify viable land-use alternatives over a 50-year planning horizon. The overall planning goal is to support present and future Plant operations in a manner that complies with environmental regulations and is consistent with the City's 2020 General Plan and the Alviso Master Plan. The approximately 2,680-acre planning area is located in northern San José and includes the Plant lands (~1,854 acres) and Pond A18 (~826 acres). This report characterizes the land-use opportunities and constraints associated with the Plant lands. A companion report addresses Pond A18 land-use opportunities and constraints (H. T. Harvey & Associates and others 2006).

PRIMARY LAND-USE CONSTRAINTS

This report identifies primary land-use constraints that will ultimately shape the development of land-use alternatives on Plant lands. The following are the most substantive of these constraints.

Land Use Encumbrances. Portions of the Plant lands are currently subject to a variety of encumbrances, including plant operations, easements, leases, and existing or planned land use not directly related to plant operations (e.g. bomb disposal site). The Plant and its proposed expansion areas present two types of land use constraints: 1) the land occupied by current Plant operations, and planned for future Plant operations, is not available for any other permanent or long-term use, and 2) Plant operations may generate undesirable impacts that would preclude new uses on portions of the buffer lands.

The San José 2020 General Plan. The *General Plan* acknowledges the Plant's necessary role in the welfare and growth of the City and, therefore, assumes on-going Plant and related uses on Plant lands. The two "surplus land" Discretionary Alternate Use Policies, in combination with the Public/Quasi Public land-use designation, do leave open a minor chance that less-than-compatible uses on the buffer lands could be found consistent with the General Plan, and approved.

City Council Policy on Use of Plant Lands. This Council Policy limits use of the Plant lands to Plant operations and expansion and to uses that support Plant operations and/or avoid interfering with them.

Surrounding Land Uses. The City of Milpitas has reported neighborhood complaints about Plant odors. To reduce future conflicts, expansion of Plant operations and any new Plant lands uses should be designed to avoid or minimize odor impacts in Milpitas. Future land-use modifications should also avoid generating new odors or exacerbating flooding within the Alviso Village area.

Flood Control. Plant lands are mapped within the Federal Emergency Management Agency (FEMA) coastal floodplain (FEMA 1988), except for the higher elevation southeast corner of the property. This is because ground elevations for most of the lands are below the 100-year flood

level and many of the existing levees on and adjacent to Plant lands do not conform to FEMA flood protection standards.

Stormwater Drainage. The stormwater-drainage capacity of the western corner of Plant lands is limited since it depends on active pumping of water from New Chicago Marsh into Artesian Slough or by pumping from the Gold Street pump station in Alviso directly to the Bay. Potential land uses for the western corner of Plant lands will need to maintain or improve the stormwater drainage and/or storage capacity in this area.

Non-engineered Levees. Non-engineered levees comprise the majority of the perimeter levees around Pond A18, and are not sufficient for flood protection requirements. The top of the non-engineered levees does not provide an all weather surface, making it unsuitable for vehicular access. Limited access makes it difficult to maintain the levee structure.

Regulated Habitats. Wetland and open-water habitats currently exist on site and likely meet the regulatory definition of waters of the U.S., under U. S. Army Corps of Engineers (USACE) jurisdiction. Placement of fill into jurisdictional waters of the U.S. would require permits from the USACE, Regional Water Quality Control Board, and Bay Conservation and Development Commission (for some of the wetlands and other-waters), and mitigation would likely be required. The riparian-woodland habitat along Coyote Creek likely falls under the regulatory jurisdiction of the California Department of Fish and Game (CDFG). A streambed alteration agreement and riparian mitigation would be required from CDFG for impacts to this riparian habitat.

Burrowing Owls. Burrowing Owls (*Athene cunicularia*) occur in the southern portion of the Plant lands, where open grassland habitat occurs. Any Burrowing Owls on the project site would be subject to the following regulatory considerations: impacts would not be allowed during the breeding season, and relocation or habitat loss would require mitigation and approval by the CDFG.

LAND-USE OPPORTUNITIES

Fourteen land-use opportunities for Plant lands were identified and the benefits and constraints described in the report. Below is a brief summary of each opportunity.

Plant Expansion Opportunities. The adopted City Council Policy for Plant lands estimates that approximately 200 acres would be required for Plant expansion in the future to provide for likely process and capacity improvements. This report identifies an optimum expansion area for the Plant's Primary Operations Center as an arc of land located south of the existing Plant facility. This location is optimal with respect to cost-effectiveness, community safety, and habitat protection.

Water Recycling Facilities Expansion. Approximately 31 acres of Plant land along the east side of Zanker Road has been set aside for advanced recycled water treatment facilities. Advanced treatment of the Plant's recycled water would improve water quality, thereby expanding the market that could potentially use this water. Advanced water treatment facilities

should not require the entire 31-acre area. Therefore, portions of this area could also be used for future Plant capacity expansion.

Interim Land Uses for Plant Expansion Area and Buffer Lands. Interim land-use opportunities for the Plant expansion/buffer lands were identified that would meet many of the land-use planning goals, but could be easily altered in the future, if necessary, to serve the Plant's core purpose. These opportunities, while not directly benefiting the Plant's operation, will likely enhance the community's perception of the Plant. Opportunities include mini-recreation facilities, agriculture, and constructed seasonal wetlands and/or willow sausals (dense thickets dominated by willows with some Fremont cottonwood). Buffer land uses that increase the presence of the general public would not be appropriate until hazardous chemicals such as chlorine and sulfur dioxide are phased out and less hazardous alternatives are phased in. Additionally, popular activities may be difficult to remove from use despite their interim status and could become *de facto* permanent uses.

Biosolids Odor Reduction Opportunities. The biosolids storage lagoons and drying beds located in the most eastern areas could be relocated to the old biosolids lagoon area and/or to a new site within Pond A18 to reduce potential offsite odor impacts. By relocating the facilities further to the northwest, odorous emissions will have more time to disperse before reaching offsite receptors in Milpitas and the Rincon residential properties. Furthermore, odor dispersion may be enhanced by construction of a deflection wall along the eastern edge of the lagoons and drying beds.

Riparian Corridor Widening Along Lower Coyote Creek. Relocation of the biosolids drying beds away from Coyote Creek would create an opportunity to both restore additional riparian habitat and improve flood protection along Coyote Creek. This opportunity would entail relocating the existing flood control levee along this reach to a location further west where biosolids drying beds are currently located. This option dovetails with the biosolids odor reduction opportunity where biosolids drying beds would be relocated to the northwest further from odor receptors in Milpitas. The drying-bed area would be restored to the appropriate topography and soils to support floodplain riparian habitat. The Santa Clara Valley Water District's Lower Coyote Creek Flood Control Project currently provides 100-year flood protection in this reach, however the District currently removes riparian vegetation within the corridor to maintain 100-year flood protection. Setting back the levee would increase the flood capacity of the creek channel, thereby allowing space for riparian habitat while potentially eliminating the need for vegetation maintenance. Alternatively, willow sausals could be created within the existing drying bed area as a means of providing both riparian habitat and wastewater effluent discharge and/or treatment. A portion of the current effluent discharged to the South Bay could be diverted to flood irrigate created willow sausals and utilize the high evapo-transpiration rates of these trees to release wastewater effluent to the atmosphere.

Restoration of Riparian to Tidal-Habitat-Transition Zone Along Lower Coyote Creek-Coyote Slough. The opportunity exists to combine the riparian-corridor widening option with tidal marsh habitat restoration in Pond A18. Combining these opportunities would restore a broad, natural transition zone along the salinity/tidal gradient from non-tidal riparian habitat (freshwater) to tidal freshwater marsh and finally to tidal-brackish marsh. A naturally self-

sustaining ecosystem would be restored in place of the existing, costly managed system. Such transition zones existed historically along the major watercourses entering the South Bay and have all been eliminated by flood control improvements and development in the former floodplains. This is one of the last opportunities in the South Bay for such a restoration. Similar to the riparian corridor widening opportunity above, this opportunity would entail relocating the existing flood control levee along Coyote Creek further to the west where the biosolids drying beds are currently located. To facilitate odor reduction, biosolids drying beds would be relocated to the northwest further from odor receptors in Milpitas. Similar to the riparian corridor widening opportunity above, this opportunity could also allow adequate channel capacity to support riparian habitat without the need for regular vegetation maintenance for flood control.

Flood Protection Improvements-South San Francisco Bay Shoreline Study. The USACE and non-federal partners are beginning a Feasibility Study for an updated South San Francisco Bay Shoreline Study that includes Plant lands and Pond A18. The goals of the 2006 Shoreline Study are flood damage reduction and ecosystem restoration along the South San Francisco Bay shoreline. The opportunity exists for the City to partner and cost-share with the USACE in planning, design, and implementation of flood protection and habitat restoration. In contrast to the current non-engineered levees around the southern and western perimeter of Pond A18, the future shoreline levee would be an engineered levee providing 100-year flood protection that would meet Federal Emergency Management Agency (FEMA) standards.

Co-composting Facility. A co-composting facility that creates compost from biosolids and wood waste/green waste could be established on Plant lands. The facility would produce a soil amendment that could be used on agricultural lands or marketed for other horticultural purposes. The Plant will ultimately need to diversify the potential uses for its biosolids since the Newby Island Landfill is scheduled to close in 2020. Moreover, the surface area of biosolids drying beds could be substantially reduced with a co-composting facility, since the percent solids content requirement for co-composting is much lower than that for landfill cover. The drying bed area could potentially be reduced by 50%, from 265 acres to approximately 133 acres. With this reduction, the old biosolids lagoons area (~214 acres) would easily accommodate both an Aerated State Pile composting facility and relocated drying beds. While there is a viable market for co-compost in the region, co-composting is not expected to generate enough revenue to offset production costs. However, it would reduce the risk associated with the potential closure of the Newby Island Landfill. Compared to other options that may be required if the landfill closes, co-composting may be economically advantageous. In addition, co-composting would allow simultaneous management of biosolids and the City's wood/organic wastes.

Regional Biosolids Processing Facility. Most wastewater utilities in the Bay Area beneficially reuse biosolids as a soil amendment at sites in Solano and Merced Counties or as alternative daily cover at various local solid waste landfills. Projected regulatory constraints and prohibitive hauling costs may limit the possible use of the Solano and Merced facilities as viable options in the future. Therefore, there is a need for a regional biosolids processing facility. Such a facility could be located on Plant lands. A variety of processing technologies are available to produce a marketable product while minimizing odor generation. Fees charged to other utilities could potentially offset costs of processing biosolids from the Plant.

Biosolids Monofill. A portion of Plant lands could be used to develop a biosolids monofill similar to the facility used by the Sacramento Regional county Sanitation District. The monofill could be used exclusively by the Plant, or it could accept biosolids from other wastewater utilities in the Bay Area.

Biosolids or Co-compost for Tidal Marsh Restoration. Dried or co-composted biosolids could potentially be used beneficially for tidal-marsh restoration in Pond A18 or in other locations associated with the SBSP Restoration Project. For example, the SBSP Restoration Project has proposed restoration of extensive lengths of tidal marsh-upland transition zone habitat along the upland edges of restored tidal marshes. If dried or co-composted biosolids could be used alone, or mixed with dredged material, to build this transition zone substrate, the SBSP Restoration Project would comprise a relatively large market (0.8 to 4.4 million cubic yards).

Solar power generating facilities. A portion of Plant lands could be used to develop a solar energy production facility. Electricity and/or heat could be generated using photovoltaic generation or concentrating solar power technologies. Such a facility would offset power consumption within the Plant, reducing energy expenses in the long-term. If a UV disinfection process were implemented, a solar power plant could offset a significant portion of the energy used for this process.

Soil Stockpiling for Construction Projects. A portion of Plant lands could be leased to landfill operators as a place to store excess soil from construction sites in the region. Contractors would pay a fee to deposit soil that could be used later as landfill cover material. This opportunity could generate revenue to reduce Plant operational costs.

Public Access and Environmental Education. An alternative alignment for the future San Francisco Bay Trail Primary Bay Spine may be possible along the future Shoreline Levee that could be located along the southern perimeter of Pond A18. This alignment would connect the proposed short spur terminating at the Don Edwards National Wildlife Refuge Environmental Education Center to the existing Bay trail along the east side of Coyote Creek. This alignment would be safer for the public and far more aesthetic than the Primary Bay Spine proposed in the City's Bay Trail Master Plan along Zanker Road (Amphion Environmental 2002). Any proposed public access to the Plant lands must take into account the security of the Plant's operations and the safety of the public.

OPPORTUNITIES RATING

The development of land-use alternatives will involve selecting and combining opportunities to create land-use alternatives that respond to varying degrees to the project's land-use planning goals. To assist with this process, the matrix below provides a qualitative rating of each opportunity relative to the project's land-use planning goals. The opportunities were rated in a collaborative meeting with representatives from City Staff, the West Valley Sanitation District, and H. T. Harvey & Associates. While many of the opportunities may provide negative or positive impacts that could be extrapolated to the City or County, the ratings were determined solely on the basis of their net impact as related to the Plant lands.

The rating scale was defined as follows:

0	=	No net impact (or neutral impact) of the opportunity on meeting the goal.
-	=	Net negative impact (without additional effort/mitigation) of the opportunity on meeting the goal.
+	=	Net positive impact of the opportunity on meeting the goal.
++	=	This rating was used for comparisons between similar opportunities.

In addition, the Matrices rank the capital costs for each opportunity. Rankings for the capital costs were based on the following criteria:

- Low - $ 1 million and could be funded under the existing operating budget and staff. A low rated opportunity could be accomplished in less than two years.

- Moderate – $ 1 million - $10 million and would require only minor changes to the existing operating budget. These opportunities could be accomplished in approximately two years.

- High – $10 and 100 million and would require a large capital investment. These opportunities would take greater than two years to implement.

- Very High – > $100 million and would require a large capital investment; accomplishment of this goal would require numerous years.

The cost rating includes the cost of design, environmental clearance, and construction.

Plant Lands Opportunities/Goals Matrix.

OPPORTUNITIES	GOALS						
	Flexibility for Plant Land Uses	**Regulatory Compliance**	**Worker and Community Safety**	**Habitat Protection and Restoration**	**Good Neighbor/ Public Value**	**Economic Opportunities**	**Capital Cost Ranking**
Plant expansion	+	+	+	-	0	0	Very High
Water recycling facilities expansion	+	+	0	0	+	+	Very High
Interim land uses for plant expansion area and buffer lands/Mini-Rec Facilities	-	+	0	-	++	-	Low per facility
Interim land-uses for Plant expansion area and buffer lands/Agriculture	0	+	0	0	+	0	Revenue Generating
Interim land-uses for plant expansion area and buffer lands/Constructed wetlands	-	+	0	+	+	0	Moderate[1]
Biosolids odor reduction opportunities	0	+	0	-	+	0	Moderate-Odor Wall High-Drying Bed Relocation
Riparian corridor widening along Lower Coyote Creek	-	+	+	+	+	+	Moderate
Restoration of riparian to tidal habitat transition zone along Lower Coyote Creek-Coyote Slough	+	+	+	++	+	0	Moderate [2]
Flood protection improvements – South San Francisco Bay Shoreline Study	+	+	+	-	+	+	Potential for Federal, State and Local cost share[3]
Co-composting facility (Assumes that facility is enclosed)	+	+	+	0	Unknown	+	High

OPPORTUNITIES	GOALS						
	Flexibility for Plant Land Uses	**Regulatory Compliance**	**Worker and Community Safety**	**Habitat Protection and Restoration**	**Good Neighbor/ Public Value**	**Economic Opportunities**	**Capital Cost Ranking**
Regional Biosolids Processing Facility (Assumes that facility is enclcosed)	0	0	0	0	-	+	Very High
Biosolids Monofill	0	0	0	-	0	0	Moderate
Biosolids or co-compost for tidal marsh restoration	+	0	0	+	+	+	Cost Savings
Solar Power Generating Facilities	+	0	0	-	0	+	High
Soil Stockpiling for Construction Projects	0	-	-	-	-	+	Revenue Generating
Public access	0	0	-	+	+	-	Low to Moderate[4]
Environmental education	0	0	0	+	+	-	Moderate

[1]Assumes less than 50 acres of constructed seasonal wetlands.

[2]Assumes that fill may be required to raise the floodplain and that the CC flood control levee may need to be moved will raise this cost to "Moderate." Small-scale restoration could possibly rank as "Low."

[3]Uncertain at this time on how the Federal-local cost share would work (i.e., whether the City or SCVWD would be responsible for a local match). The emphasis on this cost rank is to indicate a benefit from the Federal cost share, rather than basing the rank on the local match (undefined).

[4]Cost would depend on the length of trail and complexity of design and construction.

INTRODUCTION

The City of San José (City) is in the early stages of developing a comprehensive Land-Use Master Plan for the San José/Santa Clara Water Pollution Control Plant (Plant) lands, including Pond A18. The Land-Use Master Plan will ultimately identify viable land-use alternatives over a 50-year planning horizon. The Plant is one of the largest tertiary wastewater treatment facilities in the United States. The Plant treats the wastewater from approximately 1,300,000 residents and 16,000 businesses within a 300-square mile area encompassing San José, Santa Clara, Milpitas, Campbell, Cupertino, Los Gatos, Saratoga, and Monte Sereno (City of San José 2005). The Plant planning area is located in northern San José (Figure 1). The overall land-use planning area is approximately 2,680-acre in size and includes Pond A18 (Figure 2). This report is focused on the Plant lands. A companion report presents the land-use opportunities and constraints for Pond A18 (H. T. Harvey & Associates, CH2MHILL, David J. Powers & Associates, Philip Williams & Associates 2006).

The City's overall planning goal is to develop a comprehensive Land-Use Master Plan that supports present and future Plant operations, complies with applicable environmental regulations and is consistent with City's General Plan and Alviso Master Plan. The H. T. Harvey & Associates Team (HTH Team), which includes David J. Powers & Associates, CH2MHILL, and Philip Williams & Associates, has conducted the following initial assessment of land-use opportunities and constraints as a first step toward developing a Land-Use Master Plan. The HTH Team has reviewed background information, conducted several reconnaissance surveys of the site, revised Geographic Information System (GIS) maps in accordance with current conditions, and attended several meetings with the City to better understand the City's land-use planning vision and goals. The HTH Team then assessed land-use constraints and developed creative land-use opportunities to serve the City's vision and goals. The following assessment of opportunities and constraints is an important initial step that will facilitate the development of land-use alternatives. These opportunities and constraints will guide the development of land-use alternatives in the next phase of the master planning process.

This report first presents the City's land-use visions and goals, followed by a summary of the primary land-use constraints across the site. Next is a summary of each land-use opportunity and the specific constraints associated with that opportunity are presented. Finally, a matrix qualitatively rates the opportunities as a function of the goals.

LAND-USE MASTER PLANNING VISION AND GOALS

The Land-Use Master Plan will be developed to support the Plant's core service purpose and the City's associated land-use planning goals. The Plant's core service purpose is as follows:

> "Manage wastewater for suitable discharge into the South San Francisco Bay (South Bay) and for beneficial reuse to protect the environment and public."

The Plant lands/Pond A18 Land-Use Master Plan provides an opportunity to further strengthen the protection of the Plant lands for future uses consistent with the Plant's core purpose. In addition, the City's Land-Use Planning Steering Committee has articulated a vision and six goals for the Land-Use Master Plan. Their vision statement is as follows:

> "the goals of the Plant land-use plan must serve to protect public health, the environment, and the community's quality of life, while maintaining the ability to grow sustainably."

The Steering Committee's land-use planning goals are presented in Table 1. The first land-use planning goal, "Flexibility for Plant Uses" is the most important, since it relates to the Plant's core service purpose. The subsequent goals have equal priority and their order in Table 1 is not meant to imply a hierarchy of importance.

Table 1. Land-Use Planning Goals.

Goals	Explanatory Sentence ("The Plant aims to…")
Flexibility for Plant Uses	Operate more cost-effectively and anticipate future Plant needs for capacity, treatment, and reliability improvements.
Regulatory Compliance	Meet and exceed current Federal, State, and regional regulatory requirements while providing new opportunities for recycled water utilization.
Worker and Community Safety	Minimize toxic hazards and replace them with less hazardous alternatives.
Habitat Protection and Restoration	Encourage environmentally positive outcomes consistent with the SBSP Restoration Project effort that will increase wildlife habitat, reduce flood risk, and conserve energy.
Good Neighbor and Public Values	Improve integration and acceptance with the local community by becoming an ecological asset of natural beauty and free of odor
Economic Opportunities	Allow complementary, sustainable land uses that either generate revenue or reduce costs while providing flexibility for future growth.

EXISTING AND PROPOSED LAND USES

The following table and figure provide descriptions of existing and proposed land uses on Plant lands discussed throughout this report. Approximately 1,854 acres in size, the Plant lands include Current Plant Facilities, proposed Plant and Recycled Water Expansion Areas, buffer lands, and a proposed Public Safety Driver Training Center (Table 2, and Figure 3). The locations of the various Plant facilities, as well as existing easements and leases are shown in Figure 4.

Table 2. Existing and Proposed Land Uses on Plant Lands.

Existing and Proposed Land Uses*	Surface Area (Acres)
Current Plant Facilities	
Water Pollution Control Plant	160
Residual Solids Management Area (Current Biosolids Lagoons, Drying Beds and Operations)	532
Old Biosolids Lagoons	254
Recycled Water Transmission Pump Station	3
Santa Clara Valley Water District Flood Control Easement	171
Municipal Water System Tank	3
Subtotal	**1123**
Proposed Plant and Recycled Water Expansion Areas	
Optimum Plant Expansion Area	200
South Bay Water Recycling Expansion Area	31
Subtotal	**231**
Buffer Lands	
East of Zanker Road-excluding Water Recycling Expansion Area	103
West of Zanker Road-excluding Plant Expansion Area	184
North of Zanker Road including Nine Par Landfill	123
Subtotal	**410.**
Proposed Public Safety Driver Training Center	**31**
Total	**1795**

* The existing leases and easements are not broken out here, since they overlap the land use categories identified here.

PRIMARY LAND-USE CONSTRAINTS

The following is a summary of the primary land-use constraints associated with Plant lands organized by six subtopics: land-use encumbrances, land-use plans and policies, surrounding land uses, hydrology and geomorphology, levee conditions and infrastructure, and biology.

EXISTING LAND-USE ENCUMBRANCES

As a core service for its eight member cities and the owner of a large land area located along the southern tip of the South Bay, the Plant affects and is affected by a number of local land-use policies and plans, on-site land uses and encumbrances, and surrounding land-uses. The sections below describe the extent to which these various land use factors may be constraints on the future use of Plant lands. This examination of land-use constraints assumes that the Plant's use of these lands will continue indefinitely and thus the Plant itself emerges as a significant constraint to land uses. Figures 3 and 4 show the locations of the existing and proposed land-uses, easements and leases described below.

Portions of the Plant lands are currently subject to a variety of encumbrances, including land uses or activities that enjoy some right to occupy specific Plant lands sites, or are simply expected to remain, for some period of time. These encumbrances include:

1. plant operations;
2. existing easements;
3. existing leases, and;
4. existing or planned onsite land uses not directly related to plant operations.

The major "encumbrance" is the Plant itself. Other encumbrances are legal entitlements in the form of land leases and easements owned by others as well as the practical encumbrances represented by uses that the Plant has allowed to occupy portions of its land. Most of these encumbrances pose some form of short-term, long-term, or permanent constraint on the future use of Plant lands.

Plant Operations

The primary "encumbrance" on Plant lands is the Plant itself and its associated operations. The purpose of Plant lands is to provide appropriate space for Plant operations now and for the future, and to provide buffer areas between plant operations and surrounding lands and land uses. The continued operation of the Plant on these Plant lands is a given; elimination or relocation is not a realistic option. The Plant's current wastewater treatment activities occur within the Plant Primary Operations Area and the Residual Solids Management Area (Figure 3, Table 2). Primary Operations are located in the triangle bounded by Zanker and Los Esteros Roads and the Residual Solids Management Area occupies the northeast quadrant of the site, generally between the primary operations facilities and Pond A-18 (Figure 4). A 25-acre bomb disposal site is located within the Old Biosolids Lagoon Area and is administered by the City of San José Police Department.

There are elements of Plant operations that could present land use constraints beyond simple occupation of space. The most obvious of these is odor generation, although it has not been possible to quantify odor generation. There is a history of complaints from surrounding communities (including Milpitas) about Plant odors. It is probable, however, that some of the odor attributed to the Plant is actually generated elsewhere (landfills or mudflats, for example). The Plant's purchase and designation of buffer lands was intended to buffer adjacent land uses from potential odors and safety hazards.

The Plant uses and stores large quantities of gaseous chemicals that could cause serious injury or even death in the event of an accidental release. There has never been a serious incident involving the chemicals that resulted in off-site impacts.

Over time, Plant operations and technology will change. Conditions that now constitute constraints will change or cease to exist. For example, the Plant is planning to phase out the use of gaseous chlorine within the next 5 years and plans to substitute sodium hypochlorite (liquid bleach) for disinfection. Sodium bisulfate will be substituted for sulfur dioxide for dechlorination. However, sulfur dioxide will still be needed as a back up for dechorination. Long-term planning should include opportunities that may be infeasible now but will become feasible in the future.

The adopted City Council Policy for Plant lands has identified the need for approximately 200 additional acres for future Plant operations expansion to accommodate planned urban growth in its service area and to respond to new technological opportunities and demands (City of San José 2000). The preferred location for this expansion area is adjacent to the south side of the Primary Operations Area (Figure 3). (see the Land-Use Opportunities/Plant Expansion section below for the rationale behind the proposed expansion area configuration).

Plant Operations Land-Use Constraints: The Plant and its expansion area presents three types of land use constraints: 1) the land occupied by current Plant operations, and planned for future Plant operations, is not available for any other permanent or long-term use; 2) Plant operations may generate undesirable impacts that would preclude new non-Plant uses on portions of the buffer lands; and 3) new or expanded Plant activities could generate undesirable impacts on surrounding properties. This potential for undesirable impacts could significantly limit the new or expanded Plant activities. Sensitive uses would be those accommodating people in large numbers or for extended periods of time, including residential uses. Potential Plant generation of odors, on-site railroad deliveries and storage of gaseous chemicals (*i.e.*, chlorine) represent impacts that could be considered inconsistent with any uses characterized by significant human occupation.

Existing Easements

The periphery of the Plant lands is loosely framed by a series of easements owned by public utilities, Southern Pacific Railroad, the SCVWD and a variety of adjacent landowners (Figure 4). Easements are typically long-term entitlements, although, they can be renegotiated, abandoned or moved if both parties agree, particularly if the original purpose of the easement no longer exists.

Complete records of the terms, conditions, and rights retained by the Plant for most of the easements were not available for review during preparation of this report. It can be assumed, however, that easement areas are generally unavailable for any significant Plant land use although Plant access may be allowed over certain easements. Reliable records will have to be located prior to making specific land-use proposals involving these easements The following is a description of the existing easements and associated constraints, starting at the northeast corner of the Plant lands and moving clockwise.

SCVWD Conservation Easement (171 ac). This easement occupies the northeast corner and the east edge of the Plant lands and includes Coyote Creek and lands along its west side. SCVWD activities within the easement area include flood control and a number of flood-control mitigation sites, including a major riparian habitat restoration project, salt marsh harvest mouse mitigation site, waterbird pond mitigation site, long-term avian research activities conducted by the San Francisco Bay Bird Observatory (SFBBO), and riparian habitat. This easement has been granted "for as long as needed" and permits Plant access but prohibits "any interference with flood control".

Easement Constraints: This easement area would not be available for any Plant uses incompatible with the Water District's flood control or mitigation site activities. Plant access is allowed as long as it does not interfere with flood control.

Ingress/Egress Easement (1.8 acres). Located within the west edge of the SCVWD Conservation Easement, this 25-foot wide easement provides access to Pond A18.

Easement Constraints**:** This easement by itself should pose no constraints to Plant lands use in addition to the underlying constraints of the SCVWD conservation easement.

Right-of-Way Easement (3.3 acres). Located within the north edge of the Plant lands as well as the north edge of the SCVWD Conservation Easement, across from Newby Island, this 50-foot wide easement also appears to provide access to a portion of the levee on the north side of Pond A18 which is owned by the SCVWD.

Easement Constraints: This easement by itself should pose no constraints to Plant lands use in addition to the underlying constraints of the SCVWD conservation easement.

Pacific Gas & Electric (PG&E) Easement (19.7 acres). This area contains two easements that allow PG&E non-exclusive rights to access and maintain power lines. The easements run along the Plant's lower east side and much of its southern boundary. For most of its length, this PG&E easement area runs in tandem with a similar easement owned by Silicon Valley Power, and is occupied by high voltage power lines.

Easement Constraints: PG&E high-voltage power-line easements typically prohibit uses incompatible with the function and maintenance of the power lines, but do leave underlying landowners with rights to access and activities compatible with PG&E purposes.

Silicon Valley Power Easement (19.6 acres). This easement also grants non-exclusive rights to access and maintain high power lines. It begins on the lower east side of the Plant lands and

runs adjacent to the PG&E easements for most of their length, but angles away from the south property line and ends at the San José Municipal Water tank site. This is a relatively new easement occupied by Silicon Valley Power's newly constructed (240 kv) major transmission line. The line is underground for part of its length, at the easement's west end.

Easement Constraints: This easement would preclude uses incompatible with the function and maintenance of the power lines but does permit Plant access and activities compatible with the operation of the power lines.

Los Esteros Critical Energy Facility (CEF) Access Road Right Of Way (11.6 acres). This easement roughly parallels parts of the PG&E easement between Zanker Road and the southeast corner of the Plant lands. It is improved with a landscaped, paved roadway providing access to the Calpine power plant and power lines to the east. A portion of the easement is set aside for open space, which must be maintained by Calpine.

Easement Constraints: The Plant apparently has full access within this easement and is constrained only by the access rights of the power company and perhaps the requirements of the open-space area.

Southern Pacific Railroad Easement (6.3 acres). This 60-foot wide railroad easement begins at Los Esteros Road and ends just west of the Plant's Primary Operations area. It provides railroad access to the plant for delivery purposes and could be exclusive. Additionally, the Plant owns and maintains the railroad spur through New Chicago Marsh.

Easement Constraints: As long as railway use of the easement continues, this area is not available for other Plant uses or activities.

Zanker Ingress/Egress Easement (1.1 acres). This 50-foot wide easement crosses a portion of the former Nine Par Landfill site, now owned by the Plant, and provides access to the Zanker Road Landfill site. It is developed with a paved and gated driveway.

Easement Constraints: This easement area would not be available for Plant uses or activities inconsistent with the access needs of the Zanker Road Landfill site. The easement may allow Plant access over it but that information is not available.

PG&E Easement (65.5 acres). This second PG&E easement is also for purposes of accessing and maintaining high power lines. It extends from Artesian Slough eastward to the Zanker Road Landfill property line where it turns northward and continues across Pond A18, ending at the approximate midpoint of the Pond A18 Public Recreation Easement. It is occupied by above-ground, high-voltage lines.

Easement Constraints: PG&E high-voltage power-line easements typically prohibit uses incompatible with the function and maintenance of the power lines but do leave underlying landowners with rights of access and activities that are compatible with PG&E purposes.

Additional access easements. Many of the underground interceptor lines have access easements attached to them.

Existing Leases

There are currently three Plant land sites that are leased to private users. Leases are contractual agreements for the rental of property. They run for some specified period of time and are frequently structured to be renewable at some specified interval. As is the case for Plant land easements, some relevant information about area leases was not available at this time and will be filled in later when land uses are being considered. Compared to easements, however, leases tend to be shorter term and simpler to end. The following is a description of Plant land leases starting at the eastern side of the Plant lands and moving clockwise.

McCarthy Strip Lease (6.0 acres). This strip of land lies along the east bank of Coyote Creek and is located within the City of Milpitas, but is owned in fee title by the Plant and is leased back to McCarthy for farming purposes. The Plant also owns control of the "McCarthy strip" development rights until August 17, 2060 but the remaining length of the farming lease is not available. The strip is approximately 100 feet wide for much of its length, and about 2,400 feet long.

Lease Constraints: It is unlikely that this rather narrow lease area represents any significant constraint to Plant use. Its location within the City of Milpitas could present some future constraints or complications. When the agricultural use ends, the strip may be most useful as a riparian mitigation area.

Arzino Horse Ranch Lease (50.9 acres). The horse ranch is located along the southwest edge of the Plant lands and is leased by the Arzino family for the purpose of boarding, grazing and training horses. There are a variety of shed-like or canopy structures for housing or sheltering horses on the site, however, there are no significant structures. The terms of the lease apparently prohibit any residential use on the property. The lease is currently a month to month lease.

Lease Constraints: The Horse Ranch poses a constraint to any significant Plant use of the property as long as the lease remains in effect.

Jubilee Church Lease (1.1 acres). The Jubilee Church easement is located adjacent to both the Arzino lease lands and the San José Municipal Water Tank and is leased by the nearby Jubilee Church for use as a small park. This lease is month-to-month.

Lease Constraints. This small month-to-month lease area is unlikely to present any significant constraints.

Existing or Planned On-site Land Uses Not Directly Related to Plant Operations

Plant lands are being used, planned or maintained in several areas, for purposes not directly related to Plant operations. Most of these facilities and activities are managed by the City of San José and do not involve leases or easements. Even though the City may theoretically be able to move or remove them at will, these uses do pose at least short-term constraints to re-use of the areas they occupy, since the City may be unable to remove or modify them at some particular juncture. The following is a description of these land uses starting at the northern portion of Plant lands and progressing clockwise.

Bomb Disposal Facility (25 acres). A bomb disposal facility is located within one of the old biosolids lagoons and is operated by the San José Police Department.

Constraints**:** No use which might subject persons, animals or property to injury or damage from the bomb disposal activities, should be located near the disposal basin.

South Bay Water Recycling (SBWR) Transmission Pump Station (4 acres) and Expansion Area (30.7 acres). These two sites are located on Zanker Road in the southwest corner of the Plant lands. The pump station itself occupies roughly two acres.

Constraints: The continued operation of the Pump Station would appear to preclude any additional or alternative Plant land uses on the 4-acre site but any constraints posed by the expansion site are unclear.

Public Safety Driver Training Center (31 acres). A public safety driver training center is currently being planned by the City of San José's Public Works Department. This facility would be located at the south end of the Plant lands, just north of Highway 237. Since the City is currently in the process of designing the facility, the exact surface area and configuration is unknown. As such, the facility's location and configuration shown in Figure 4 are approximate. The facility will be owned by the City of San José and will be used to train police officers and firefighters in the skills needed to handle service vehicles safely, particularly under extreme conditions. Expected impacts would probably include additional noise, visual impacts, possible impacts to wetland habitat, and perhaps runoff from large paved areas. CEQA review, however, has not been completed for this project and potential impacts have not yet been identified or evaluated. In addition, official approvals have not yet been granted for the facility.

Constraints: The site would be unavailable for alternative uses should the facility be approved and constructed. An EIR is under development for the Public Safety Driving Training Center and impacts will be analyzed and discussed in that document.

Appropriate stormwater control measures may be required for rainfall runoff water quality treatment. Similar measures may also be required to avoid the potential for increased rainfall runoff from impervious surfaces to increase downstream flood hazards in the Guadalupe River and Alviso Slough.

San José Municipal Water Tank (3.38 acres). Approximately one-half of this site is occupied by a San José Municipal Water System tank. The site is located on the north side of Disk Drive, at its easterly terminus.

Constraints: While information regarding constraints is not available for this site, it is assumed that the presence and nature of the tank would preclude any public uses of the site as well as any use that would jeopardize the security or maintenance of the tank.

Burrowing Owl Management Area (50 acres). Five pairs of burrowing owls were relocated in 1997 from the 3COM site south of Highway 237 to a 50-acre area at the west corner of the Plant lands, just north of the Arzino Horse Ranch (H. T. Harvey & Associates 1997). The five 3COM pairs plus the pre-existing owl population grew to 15 occupied burrows by late 2003. This relocation was conducted under the auspices of the California Department of Fish and Game

(CDFG), with an agreement for a thee-year monitoring program (CDFG 1997). No permanent conservation easement was established for these owls and therefore, there is no longer a legal requirement associated with the 3COM mitigation agreement.

Constraints The City currently manages this area for Burrowing Owls. Any Burrowing Owls within the "management area" would be subject to the same regulatory considerations as other Burrowing Owls on the Plant lands. Impacts would not be allowed during the breeding season, and relocation or habitat loss would require mitigation and approval by the CDFG. However, these requirements do not pose a substantial constraint to future uses of the site provided that ample suitable mitigation area remains on other portions of Plant lands.

South Bay Water Recycling Fill Station (2.5 acres). A public fill station for dispensing recycled water is located on the north side of Los Esteros Road within the former Nine Par Landfill property and at the south end of Artesian Slough.

Constraints: Since any terms and conditions regarding the Fill Station were not available at this time, it is not possible to characterize or quantify constraints. Nonetheless, it is likely that the facility could be relocated elsewhere on the Plant site.

LAND-USE PLANS AND POLICIES

The San José 2020 General Plan

A general plan is a community's official statement of policy for its physical development. It identifies property-specific land uses in a balance intended to achieve the community's social, economic and environmental goals. In the State of California each municipality and county is required to have a general plan and to conform to it. By and large, constraints placed on the Plant lands by the *San José 2020 General Plan* appear to be in the direction of compelling continued use of those lands for the Plant purposes (City of San José 1994). The *General Plan*, however, is a complex document that attempts to cover all contingencies. While the Plan is designed to be internally consistent, working through it to determine its intent can, in some cases, be somewhat complicated and interpretive. In addition, the *General Plan* is not a static document and can be amended, and frequently is amended. The *General Plan*, however, can affect the use of Plant lands in several ways described below.

Public/Quasi Public and Private Open Space Land Use Designations. San José's *General Plan* identifies the pre-2005 Plant lands (before the 2005 purchase of Pond A18) as Public/Quasi Public, a designation intended to accommodate a wide range of public and private uses that provide services to the whole community or large components of it. While this designation includes a generous variety of service uses, it precludes most of the other land uses listed in the *General Plan*.

***General Plan* Service Goals.** Several goals of the *San José 2020 General Plan* address the need to provide adequate services for San José's residents and businesses. The Plant is identified as

the sole wastewater treatment facility in San José and, as such, is expected to provide that service for both existing and future levels of development.

***General Plan* Discretionary Alternate Use Policies.** The *General Plan* includes a series of Discretionary Alternate Use Policies intended to occasionally allow an alternative use, which is inconsistent with a given *General Plan* designation, to nevertheless be found consistent with the *General Plan*. Two such Discretionary Alternate Use Policies could potentially be applied to Plant buffer lands:

1. An alternate use of lands designated Public/Quasi Public can be allowed if the new use is compatible with surrounding properties is consistent with General Plan policies, and is found to be more appropriate than Public/Quasi Public use.
2. City owned lands can be used for affordable housing which meets certain standards.

***General Plan* Compatibility Goals.** The *San José 2020 General Plan* stresses the need for compatibility between proximate land uses and for inherently incompatible land uses to avoid inappropriate impacts on their neighbors. The General Plan, however, does not specifically require Public/Quasi Public uses to avoid causing impacts. The Plant has the potential to generate unacceptable odors and chemical releases on neighboring properties and, over the years, has largely mitigated this impact by utilizing its buffer lands to maintain distance between plant operations and neighboring properties and communities.

Urban Growth Boundary. The Urban Growth Boundary, formerly the Urban Service Area Boundary, has delineated the limitations of urban development in San José since 1971. While the Plant lands have always been included within the urban area, the recently acquired Pond A18 is outside the Boundary and, therefore, unavailable for urban development. The Urban Growth Boundary is not only a fundamental principle of the General Plan but was also approved by the public as a ballot measure in 2000. Changing the Boundary line in any significant way is not a reasonable expectation.

Constraints. The *General Plan* acknowledges the Plant's necessary role in the welfare and growth of the City and, therefore, assumes on-going Plant and related uses on Plant lands. General plan policies are also structured to discourage, but do not preclude, new uses on the buffer lands that may be incompatible with Plant operations and/or otherwise likely to jeopardize Plant objectives. The two "surplus land" Discretionary Alternate Use Policies, in combination with the Public/Quasi Public land-use designation, do leave open a minor chance that less-than-compatible uses on the buffer lands could be found consistent with the General Plan, and approved. The General Plan does allow for a range of Public/Quasi Public uses on the pre-2005 site that would be compatible with Plant operations. General Plan policies would also discourage any significant impacts on nearby properties from new or expanded uses on Plant lands.

The Alviso Master Plan

The City adopted the *Alviso Master Plan* as the City's ninth specific plan in December of 1998 (City of San José 1998). Specific plans are incorporated into the *San José 2020 General Plan* but provide a more detailed level of direction for the type, quality and character of development

within their boundaries. The *Alviso Master Plan* includes all of the City of San José's sphere of influence north of Highway 237 and is a vision for preserving the unique charm of the village of Alviso while providing additional community amenities and improvements as well as opportunities for new industrial and commercial development outside of the village.

The Plant lands, including its buffer lands and Pond A18, are located within the *Master Plan* area. The *Master Plan* specifies that:

> The "buffer lands should contain Plant-related, public land uses which effectively separate Plant activities from private urban uses."

To support this land use principle, one of the Plant lands land use designations was changed during the master planning process. While the bulk of the Plant lands had been designated for Public/Quasi Public use since San José adopted its first "modern" general plan in 1975, several parcels at the south end had been designated for Light Industrial use during the 1980's. Through the *Master Plan* process, the entire pre-2005 site was given the P/QP designation it now has; the Pond A18 Private Open Space land use designation was not changed. The *Master Plan* reflects the importance of the Plant to the future of San José and is structured to preserve the Plant's viability.

Constraints. The constraints presented by the *Alviso Master Plan* are similar to the *General Plan* land use and Urban Growth Boundary constraints (same limited land uses and incorporation of the Plant into the fabric of the *Plan*). However, the *Master Plan* does not repeat all of the *General Plan* service and compatibility goals and policies. The *Master Plan's* major concern regarding the Plant lands would be limiting re-use of those lands and avoiding undesirable impacts on the Alviso village area.

City Council Policy on the Use of Plant Lands

The City maintains a series of formal Council Policies, which spell out the Council's position on various matters of importance to the City. The Council, through its Policy on the Use of the Plant lands, makes the following general points regarding use of the Plant lands (City of San José 2000).

- The highest priority land use for Plant lands is to support Plant operations and effluent-discharge-permit compliance and to avoid constraining the Plant's flexibility to respond to future requirements. The Plant's expansion area is defined as 200 acres directly south of the existing Plant. (see Plant-Expansion Opportunities discussion in the Land-Use Opportunities section below)

- Buffer land uses must protect biological resources and provide environmental benefit.

- Buffer land uses must be compatible with the City of San José's *General Plan* and with the *Alviso Master Plan*.

- Buffer land uses, which provide some dual benefit to the City or other segment of the community, may be considered.

Constraints. This Council Policy limits use of the Plant lands to Plant operations and expansion and to uses that support Plant operations and/or avoid interfering with them. The Policy also promotes activities that protect biological resources, provide environmental benefit, and/or provide some dual benefit to the Plant and the public.

The Riparian Corridor Policy Study

The *Riparian Corridor Policy Study* is an approved City policy plan that primarily addresses techniques/guidelines for how new public and private development along riparian corridors should respect and enhance the health of riparian ecosystems (The Habitat Restoration Group and others 1999). The major land use related guideline calls for buildings, structures, paving, non-riparian plantings and most intensive activities to be set back 100 feet from the top of the creekbank or the outer edge of vegetated riparian corridors, whichever is greater. The policy also lists exceptions to the 100-foot riparian setback based on the type and location of proposed projects. Other activities, such as night lighting and storage of equipment and chemicals, are required to have 200 to 300 foot setbacks. The *Riparian Corridor Policy Study* generally requires setback areas to be planted with riparian vegetation.

Constraints. An approximately 7,800 linear foot reach of the Coyote Creek riparian corridor occurs along the eastern portion of Plant lands. The riparian habitat within the corridor is of high quality since it comprises dense stands of native riparian trees and shrubs. The 100-foot setback would apply to any land use changes along this corridor unless: (1) the new use is more compatible with the riparian corridor than the existing use; and (2) the new use will have significantly less impact on the corridor than the existing use. A 100-foot setback from either the outer edge of the flood control levee/top of bank or the outer edge of the vegetated corridor would extend into the existing biosolids drying beds and lagoons. Therefore, a 100-foot setback would apply to most proposed projects and a 100-foot setback from the creek's top of bank (likely top of flood control levee) would extend into the existing biosolids drying beds and lagoons. Therefore, the riparian setback would potentially constrain land-use changes along the eastern edge of these lagoons and drying beds that were inconsistent with the protection and restoration of riparian habitat.

SURROUNDING LAND USES

City of Milpitas

The City of Milpitas, one of the Tributary agencies of the Plant, is located the east of the Plant lands, across Coyote Creek, and extends into the east foothills. Milpitas is a balanced community with many neighborhoods, large industrial and commercial areas and community amenities such as parks, schools, playfields, and libraries. Many Milpitas residents, employees and visitors have voiced complaints regarding odors emanating from Plant activities. While there are some legitimate questions about the source of these odors, Milpitas was prevailed upon

to abandon its plans to include residential development in its McCarthy Ranch project in the early 1990's. The Plant purchased the "McCarthy strip", located along the east side of Coyote Creek, and its development rights in 2000 to preclude residential development at this proximity to the Plant.

The McCarthy Ranch project occupies essentially all of the area between the Plant lands and Highway 880 and consists primarily of large-scale commercial businesses, which seem to be somewhat more tolerant of land-use impacts, including odors, than residential neighborhoods. Along the east side of Highway 880, development in Milpitas is primarily industrial, a category of development that is generally most tolerant of impacts associated with nearby land uses. Two or three small enclaves of housing are located within a half mile of the Plant and are exceptions to the industrial use pattern on the east side of Highway 880. Residential uses are typically the most sensitive to any perceived impacts from surrounding land uses.

The City of Milpitas has reported regular complaints about Plant odors from neighborhoods located well beyond the industrial area, at significant distances from the Plant. The Bay Area Air Quality Management District (BAAQMD) has a log of odor complaints from residents of Milpitas. The log for the period January 1, 2002 through April 25, 2005 includes 15 confirmed complaints and 20 unconfirmed complaints made about Plant odors from residential addresses in Milpitas. The prevailing northwest winds are likely to carry any odors generated in the larger Plant vicinity toward Milpitas. Therefore, although it is possible that some of those odors are coming from Plant operations, it is also possible that odors are coming from area landfills, compost operations, or the natural environment (the San Francisco Bay, saltponds, mudflats, or marshlands) in the region.

Constraints. To reduce future conflicts, expansion of Plant operations and any new Plant lands uses should be designed and located so as to avoid or minimize odor impacts in Milpitas.

Alviso Village

The village of Alviso, annexed into the City of San José in 1968, is located approximately 1500 feet west of the Plant lands at their nearest points. The residential neighborhood is located at that nearest point; it is compact and fairly intensely developed, primarily with single-family houses and duplexes. There are approximately 700 households in Alviso. The remainder of the village is more loosely developed with a mixture of small-scale commercial, industrial, residential and public uses. The west portion of this mixed-use area is listed as a Historic District on the National Register of Historic Places and is a California Point of Historic Interest, in recognition of its major economic importance to the South Bay between the early 19th and early 20th Centuries.

Although the village of Alviso is largely residential, residents apparently do not have a history of complaining to the Plant or the City of San José about suspected Plant odors. There may be a range of explanations for this situation, including the upwind (prevailing) location of the residential district, but no rigorous analyses have been conducted. On the other hand, residents of Alviso have a long history of political activism, frequently focused on the delivery of public services and concerns about flooding and storm drainage, and about large scale new development that might overwhelm and fundamentally change the unique character of the village. Alvisans

have also voiced concern about the placing of undesirable land uses in the Alviso area. Alviso residents have objected to the creation, expansion, and/or maintenance of each of the area landfills and recycling facilities as potentially detrimental to their community's quality of life. Protests have been voiced about the driving range, the scale and quantity of new industrial development proposed by Cisco Systems, and the scale and design of the residential project on First Street south of Grand Avenue. However, not all Alviso residents share the same viewpoint about each of these issues, and individual opinions do not necessarily remain constant over time.

Constraints. New Plant land uses, or expansions of existing uses should avoid generating new odors, flooding, or creating other negative impacts on the Alviso Village area. Certain Plant land uses may require stormwater control measures to avoid potential increases in rainfall runoff, stormwater flows, and flood risks in the Guadalupe River and/or New Chicago Marsh adjacent to Alviso.

Alviso Industrial

Most of the lands within the *Alviso Master Plan* area but outside the village are planned for Industrial Park, Combined Industrial/Commercial and Light Industrial uses. Exceptions are the mobile home park located off Gold Street and some parkland areas. Less than half of the industrial area is developed and most of that is clustered in the northeast quadrant of Highway 237 and First Street. There is a recycle facility located at the northeast corner of the Plant lands and a power plant and PG&E substation located adjacent to the east edge of the plant lands approximately 500 feet north of Highway 237.

Constraints. It is unlikely that the light industrial uses north of State Street would pose any constraints to use of Plant lands. Even the higher end industrial development around the Highway 237 and First Street intersection and planned for the Gold Street area is unlikely to trigger any constraints beyond those already generated by the Alviso village area and the City of Milpitas.

Nearby Landfills

On the north side of Los Esteros Road (due north of the Plant offices) is the Zanker Road Sanitary Landfill; farther to the west is the Zanker Road Materials Recovery Facility (formerly the Owens Corning site). The two facilities on Los Esteros Road do not accept or landfill putrescible waste and are likely to generate the same types of odors that would be associated with a general purpose landfill, food waste composting, the Plant or even the mudflats. The two facilities do generate substantial truck traffic, and may also cause visible dust and perceptible noise.

North of the Plant lands and Pond A18 is the Newby Island Sanitary Landfill and Recyclery. The Newby Island landfill operation includes food waste and green waste composting, as well as being a regional landfill that accepts municipal solid waste, including putrescibles. Odors from Newby Island can cause off-site impacts. While there is substantial truck traffic associated with

the Newby Island facilities, the Newby Island landfill traffic does not use Los Esteros or Zanker Roads. Access to Newby Island is via Dixon Landing Road in Milpitas.[1]

Constraints. Landfill traffic could conflict with any future uses of Plant lands that might also generate substantial quantities of traffic such as the regional biosolids processing facility opportunity described below. Landfill traffic could also conflict with Bay Trail users. If the landfill truck traffic does pose an unacceptable conflict with Bay Trail users, alternative solutions including realignment of the Bay Trail might need to be reconsidered.

Landfill traffic, dust, odors, and noise could limit potential sites for public access uses on Plant lands. The landfills, recycling facilities, and the Plant are not classified as sensitive receptors and from a land-use planning standpoint, they are not considered incompatible with each other.

North San José

The City of San José recently approved a series of General Plan and other policy revisions that would allow development of approximately 32,000 additional dwelling units in the area generally south of Highway 237, north of US 101, and between the Guadalupe River and Coyote Creek. None of the residential sites allowed in the newly designated residential overlay would be closer to the Plant than existing residential uses south of Highway 237. No record was found of odor complaints from North San José residents.

Constraints. It appears that existing Plant land uses and activities are generally compatible with North San José, which is farther from the Plant lands than are other "surrounding uses". New Plant land uses and expansions should avoid any new activities that would negatively affect North San José. However, if other constraints discussed above result in no new impacts for those areas, impacts on North San José would necessarily be avoided also. This includes the constraints of stormwater control and flood risks in the Gaudalupe River discussed for the Public Safety Driver Training Center and Alviso Village.

Don Edwards National Wildlife Refuge

The 25,902-acre Don Edwards National Wildlife Refuge (Refuge) borders the Plant lands to the north. The Refuge includes a variety of estuarine habitats, former salt ponds, and associated rare plant and animal species. In addition, the Refuge is part of the Pacific Flyway. During much of the year, there is an abundance of migrating waterbirds in the area. The Refuge provides breeding and foraging habitat for a large number of bird species.

Constraints. Any new or expanded Plant uses or facilities would have to avoid adverse impacts on Refuge habitat and associated special-status plant and animal species. This would include impacts to water quality and physical conditions that could disrupt breeding cycles, migration patterns, or the quality/quantity of the existing estuarine habitat. Examples of such physical

[1] Trucks hauling biosolids to Newby Island for use as alternate daily cover are classified as traffic generated by the Plant, not the landfill, since they would not be in the area if the Plant was not located on its current site.

conditions could include tall structures (including antennas and wire), night lighting, and intermittent noise.

The low-lying westernmost corner of the Plant lands receives runoff from a large portion of the Plant lands as well as from surrounding areas. The surface water that collects in this area then drains to New Chicago Marsh, which is part of the Refuge. Any land uses proposed in this westernmost corner of the Plant lands could be affected by this water movement across it.

HYDROLOGY AND GEOMORPHOLOGY

Flood Control

Plant lands are mapped within the Federal Emergency Management Agency (FEMA) coastal floodplain (FEMA 1988), except for the higher elevation southeast corner of the property. This is because ground elevations for most of the lands are below the 100-year flood level (9 feet NGVD) (Figure 5) and the existing levees around portions of Plant lands do not conform to FEMA flood protection standards. Nonetheless, the existing levees do provide some level of flood protection. Pond A18 also provides flood detention and lessens the potential for coastal flooding of Plant lands. The Lower Coyote Creek Flood Control Project widened portions of Coyote Creek and created a flood bypass channel in Coyote Slough to protect areas including Plant lands and Pond A18 from the 100-year fluvial flood event in Coyote Creek (CH2MHill 1994). Further description of the Lower Coyote Creek Flood Control Project is included in a companion report (H.T. Harvey and others 2006b)

The 1988 U. S. Army Corps of Engineers (USACE) South San Francisco Bay Shoreline Study (1988 Shoreline Study) estimated the likely extent of inundation during the 100-year coastal flood event by considering the flood protection provided by the salt pond levees, as previously maintained by Cargill, and the potential for levee erosion and failure (USACE 1988). The 1988 Shoreline Study shows that southwest portions of Plant buffer lands are subject to flooding during the 100-year coastal flood event (Figure 6). In contrast to the FEMA coastal floodplain map, the 1988 Shoreline Study shows that the levee between Pond A18 and Plant lands is expected to protect adjacent portions of Plant lands from the 100-year coastal flood event (Figure 6). This level of protection is not recognized by FEMA since the southern and western levees around Pond A18 do not conform to FEMA standards. Levees around the biosolid lagoons and biosolids drying beds and portions of Plant facilities are expected to protect against the 500-year coastal flood event, but during a 500-year event, flooding is expected to occur around Plant facilities, much of the buffer lands, and areas inboard of the Pond A18 levee (Figure 6).

In flood-prone portions of Plant lands, potential Plant land uses that would require 100-year flood protection would require flood-control measures, such as constructing flood-control levees or placing fill to raise areas above the flood level. The opportunity to improve flood control for Plant lands through the current (2006) USACE South San Francisco Bay Shoreline Study is discussed in the Land Use Opportunities Section below.

Sea-level rise may increase flood hazards in the long-term. While rates of sea level rise have been relatively constant over the past couple of centuries, the rate is expected to increase because of global warming. Global eustatic sea level is predicted to rise by 0.5 feet in the next 50 years and 1.3 feet in the next 100 years (based on mid-range estimates from the Intergovernmental Panel on Climate Change (2001)).

Local land subsidence has occurred in the Santa Clara Valley due to prior groundwater withdrawals, leaving Plant lands and surrounding areas at a lower elevation relative to mean sea level. The rate of groundwater withdrawals has since been reduced and the aquifers artificially recharged. Both activities are expected to reduce or arrest local land subsidence in the Santa Clara Valley due to groundwater withdrawals. Regional subsidence occurs in the South Bay due to tectonic activity at a rate on the order of a few inches per century (Moffatt and Nichol Engineers 1988).

Hydrology and Drainage

Plant lands are gently sloped, subsided, and low-lying (Figure 5). Rainfall runoff from portions of the Plant lands drains to areas below mean sea level and must be pumped into the Bay (Figure 5). Surface water drainage is limited by pump capacity. Groundwater levels are relatively close to the surface. Potential land uses for Plant lands should avoid increasing the rate of rainfall runoff, worsening or impeding surface water drainage, raising groundwater levels in adjacent areas, and adversely effecting beneficial groundwater use. Potential land uses in portions of Plant lands with poor drainage or high groundwater levels may require measures to improve drainage or control groundwater. Pond A18 hydrology and drainage are discussed in a companion report (H.T. Harvey and others 2006).

Surface Water. The stormwater-drainage capacity of the southern portion of Plant lands is limited. The northern portion of Plant lands includes biosolid lagoons and drying beds, which collect and store direct precipitation during the rainy season. Some rainfall runoff from areas around the biosolid lagoons drains through the Nine Par channel and culverts to Artesian Slough and Coyote Slough. Stormwater drainage from Plant lands to Coyote Creek is expected to be minimal because a levee separates Coyote Creek from Plant lands and Plant lands generally slope away from Coyote Creek.

Rainfall runoff from a large portion of Plant lands, and other surrounding areas, drains towards the low-lying western-most area (western corner) of Plant lands adjacent to Alviso Village and New Chicago Marsh (Figure 5). Surface water runoff that collects in this area drains to New Chicago Marsh through a culvert under Grand Boulevard (Figure 7). The Don Edwards San Francisco Bay National Wildlife Refuge manages water levels in New Chicago Marsh to enhance marsh habitat (USFWS 2005). New Chicago Marsh is leveed and subsided to below sea level (approximately -1 to -3 feet National Geodetic Vertical Datum [ft NGVD]), and gravity drainage to the Bay is therefore not possible. Surface water drainage to the New Chicago Marsh must be pumped out to the Bay. During the wet season, the Refuge pumps water from New Chicago Marsh into Artesian Slough via three 500 gallons per minute pumps to maintain water levels below approximately –2.0 ft NGVD. The capacity of these pumps limits the drainage rates of New Chicago Marsh, Plant lands, and other surroundings areas. Drainage of Plant lands may be impeded during storm events when the pumps reach capacity with the potential to cause

localized flooding. The City of San José Department of Public Works is currently conducting a hydrologic study of the New Chicago Marsh drainage system. This study includes the majority of the Plant buffer lands west of Zanker Road. The existing storm water pump station at Gold Street can be used to lower the levels of water in New Chicago marsh and currently does so when street flooding in Alviso is not a concern.

Potential land uses for the western corner of Plant lands will need to maintain the stormwater drainage and storage capacity in this area. Land uses that include impervious areas would require appropriate measures, such as storm-water-detention basins to avoid increasing rainfall runoff and surface water drainage. The potential to control runoff through groundwater infiltration is expected to be limited in portions of Plant lands due to the high groundwater levels and clay soils.

Groundwater. As summarized by Brown and Caldwell and others (2005), groundwater aquifers in the Santa Clara Valley Groundwater Basin are generally characterized by layers of relatively permeable alluvial sand and gravel deposits separated by relatively impermeable layers of Bay mud. Deep aquifers underlie much of the Santa Clara basin and the Bay and are typically confined by an overlying layer of ancient Bay mud. This aquifer and the confining layer of mud are buried below more recent alluvial deposits, which form a shallow aquifer that is overlain by young Bay muds. Bay muds generally extend up to the margins of the historic baylands, including Pond A18 and portions of Plant lands. The deep aquifers provide water supply in the region and are isolated from saline Bay water and any contamination in shallow groundwater by the confining layer of Bay mud, except where compromised or absent (Brown and Caldwell and others 2005).

In general, groundwater in the Santa Clara Valley Groundwater Basin is recharged in upland areas and flows towards the Bay. Localized over-pumping of groundwater in the early to mid-1900's caused a drop in inland groundwater levels and the intrusion of salt water from the Bay into aquifers, as well as ground subsidence. Subsequent groundwater management has lead to the recovery of groundwater levels and generally halted salt-water intrusion and ground subsidence (Brown and Caldwell and others 2005).

Groundwater monitoring data are available from the Zanker Road. Landfill (Golder Associates 2006a and 2006b), which is surrounded by Plant lands. Monitoring data indicate that groundwater levels fluctuate seasonally from between approximately two to six feet below mean sea level. According to monitoring reports (Golder Associates 2006b), groundwater below the Zanker Road Landfill flows north and northwest towards Pond A18 and the Bay, which is consistent with regional flow patterns. Groundwater at the Zanker Materials Processing Facility southwest of Artesian Slough, flows west and southwest towards New Chicago Marsh and the low-lying western corner of Plant lands (Golder Associates 2006a). Groundwater quality monitoring performed by the SCVWD at wells within Plant lands indicates that salt water has intruded the upper aquifer, but not the lower aquifer (Behrens 2006).

Within Plant facilities, there is an active, deep, industrial water-supply well that penetrates into the lower aquifer zone located on the buffer lands between Zanker Road Landfill and Los Esteros Road (Figure 7) (Behrens 2006). Two other active water supply wells have been

identified on Plant lands; however, the status and use of these wells have not been verified. One of these water-supply wells is located in the SCVWD Mitigation area (SCVWD 2006). The other water-supply well is located along the west side of Zanker Road between Highway 237 and Plant facilities. Another active water supply well is located north of Plant lands along the southern edge of the Newby Island landfill. Other wells located in or near Plant lands include several shallow groundwater monitoring wells (both SCVWD and Zanker Road Landfill wells) and abandoned and destroyed wells.

In addition, six wells on Plant lands are reported to be artesian wells. In artesian wells, groundwater water comes from a confined aquifer and is under pressure. Groundwater in artesian wells rises above the aquifer or even flow out of the ground. These artesian wells are not in use, and the City is in the process of removing them. (Ken Rock, City of San José 2006. pers. comm.).

Further investigation of groundwater conditions will likely be necessary for certain potential Plant land uses. For low-lying areas of Plant lands, such as the western corner, the groundwater level is likely to be near the ground surface. Certain land uses in areas with high groundwater may require groundwater control measures, such as the construction of groundwater collection systems or slurry walls. For potential land uses that would change groundwater levels, the effects on groundwater levels in adjacent areas and on increasing local salt-water intrusion into groundwater aquifers would need to be considered.

LEVEE CONDITIONS AND INFRASTRUCTURE

There is a levee structure (raised berm) around the entire perimeter of Pond A18 immediately north of the Plant lands. However, only the SCVWD's Coyote Creek Flood Control Levee along the north side of Pond A18 was constructed to FEMA and USACE standards. The remaining levee segments around the pond do not meet FEMA USACE standards. These non-engineered levee segments north of the Plant were primarily formed by dredging and dumping. The wet bay mud was often dredged from the toe of the existing slope by a barge and mounded on top of the berm to dry out over time. This type of construction is not consistent with an engineered levee fill. The dredged material most likely does not meet fill requirements for levee construction in terms of Plastic Index, strength and stability characteristics.

This type of construction did not include minimum compaction requirements and consistent grades. This deficient levee system subjects the Plant to flooding as summarized above in the Hydrology and Geomorphology Section. As also noted in the Hydrology and Geomorphology Section above, there are groundwater wells in the vicinity of the Plant lands. These wells must either be maintained or capped in accordance with the SCVWD standards to avoid the possibility of contaminating these facilities.

In addition, the top of the levee surface is uneven in both height and width and does not provide an all weather surface, making it unsuitable for vehicular access. Top of bank access is extremely limited. With limited access it is difficult to maintain the levee structure to perform as intended under existing conditions.

Ownership, jurisdiction and maintenance responsibility of the levees is shared between several agencies. Efforts to correct the levee deficiencies must be coordinated with these agencies including the SCVWD, USACE, USFWS, BCDC, RWQCB and Bay Trails Consortium.

The existing access road to the Plant (Zanker Road/Los Esteros Road) is a local two lane paved road with little or no shoulders. Although there are two points of entry (one from Los Esteros Road and one from Zanker Road), the road may be inundated during high-water events and emergency access to the Plant may be restricted. Other facilities such as the Zanker Road Landfill are immediately adjacent to the site and access to these facilities must be maintained.

BIOLOGY

There are several regulated biotic resources on-site for which resource agency permits and mitigation would be required if impacts were proposed. These resources include several different types of wetlands, non-tidal and muted tidal aquatic habitats, riparian habitat, and several special-status plant and animal species. Figure 8 provides a map of the various biotic habitats on-site and Figure 9 shows the potential jurisdictional habitats on-site. In addition, bird use of the existing biosolids lagoons is substantial, and may be sufficiently important on a regional scale so that mitigation would be required if shorebird habitat associated with these ponds was lost. These sensitive biotic resources should not constrain alternatives development, since the site offers ample opportunity to develop alternatives that enhance or at least compensate for their respective ecological impacts. The following is a brief summary of the sensitive biotic resources on-site, providing detail on why these resources do not pose major constraints, based on the 1998 Biotic Constraints Analysis (H. T. Harvey & Associates 1998) and additional reconnaissance surveys conducted in 2006.

Regulated Habitats

U.S. Army Corps of Engineers Regulated Habitats. The seasonal wetlands, freshwater marsh, non-tidal brackish marsh and salt marsh, and open-water habitats on site may meet the regulatory definition of waters of the U.S., under USACE jurisdiction (Figure 9). As outlined in the 1998 Biotic Constraints Analysis, the USACE regulates activities within wetland habitats and other jurisdictional waters of the type present on Plant lands (H. T. Harvey & Associates 1998). In addition, the USACE may extend their jurisdiction to include less obvious resources, such as several shallow depressions of low-quality seasonal wetlands observed within the buffer lands during the July 31 and November 9,2006, reconnaissance-level surveys conducted by H. T. Harvey & Associates' botanist Brian Cleary. Similarly the USACE may extend its jurisdiction to other portions of Plant lands including excavated ditches and/or other potential "historic wetland" areas that are frequently mowed.

Much of the potentially regulated wetlands, including the non-tidal salt marsh located west of the Zanker Road Landfill and north of the biosolids lagoons, consist of moderate to high-quality habitats with respect to wetland functions and values. The accurate identification of these resources typically involves a formal wetland delineation report submitted to the USACE that includes extensive field surveys, compilation of historical and existing land uses and review of laws, regulations, guidance letters and statutes dealing with such resources. Thus, it is important to note that the potentially regulated habitats depicted in Figure 9 currently represent those areas

on Plant lands that have the greatest potential to fall within USACE jurisdiction. However, completion of a formal wetland delineation would be necessary to document the full extent of potential USACE jurisdictional areas on site. In addition, the size, functional quality and exact boundary of each delineated wetland may change from one year to the next as a result of varying amounts of annual rainfall, ground water flux, and anthropogenic disturbances such as disking or other agricultural practices.

Construction activities that involve the placement of fill into USACE jurisdictional waters of the U.S. must be in compliance with permit requirements of the USACE pursuant to Section 404 of the Clean Water Act, and mitigation would likely be required if impacts were proposed. In addition, no USACE permit including the required mitigation measures will be effective in the absence of State water quality certification pursuant to Section 401 of the Clean Water Act. The State Water Resources Control Board is the state agency charged with implementing water quality certification in California.

Bay Conservation and Development Commission Jurisdictional Areas. The San Francisco Bay Conservation and Development Commission (BCDC) is a California state agency that maintains jurisdiction of open water, marshes and mudflats of the greater San Francisco Bay including Pond A18 and the tidal portion of Artesian Slough (up to mean high water) located in the northwest section of Plant lands. In addition, BCDC jurisdiction includes a shoreline band that extends 100 feet inland along the periphery of these areas. The shoreline band is included in the potential BCDC jurisdictional area shown in Figure 9.

Construction activities within BCDC jurisdictional areas must be in compliance with the BCDC permit requirements. Such activities include the placement of solid material, building or repair of docks, pile-supported or cantilevered structures, disposal of material, dredging, activities that substantially change the use of any structure or area including grading.

California Department of Fish and Game Jurisdictional Areas. Construction activities that result in diversion or obstruction of the natural flow of a stream, or substantially change its bed, channel or bank, or utilize any materials (including vegetation) from the streambed, require that the project applicant enter into a Streambed Alteration Agreement with CDFG, under sections 1601-1603 of the California Fish and Game Code. The regulatory jurisdiction of the CDFG potentially extends the definition of stream to include "intermittent and ephemeral streams, rivers, creeks, dry washes, sloughs, blue-line streams (U.S. Geological Survey), and watercourses with subsurface flows. Canals, aqueducts, irrigation ditches, and other means of water conveyance can also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife" (CDFG 1994).

On Plant lands, the high-quality, riparian-woodland habitat associated with the Coyote Creek riparian corridor likely falls under the regulatory jurisdiction of the CDFG (Figure 9). Mitigation for temporary or permanent impacts on natural resources within the riparian corridor would be required pursuant to sections 1601-1603 of the California Fish and Game Code.

Special-Status Plants

Several small populations of Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*) were identified on the buffer lands southwest of the Plant Primary Operations Center during the H. T. Harvey & Associates July 31 2006 reconnaissance-level survey. Although not listed under the state or federal Endangered Species Acts, Congdon's tarplant is considered to be a Species of Concern by the Sacramento Office of the U.S. Fish and Wildlife Service (USFWS) and is ranked as a List 1B plant (i.e., rare, threatened, or endangered in California and elsewhere) by the CNPS (2001). Congdon's tarplant is typically found in grassland habitat on well-drained, moderately alkaline clays similar to the soil type found on the buffer lands. Approximately 50-100 individual Congdon's tarplant were observed during the recent survey. The plants were evenly scattered across the landscape in low-quality, non-native grassland habitat. Additional populations of Congdon's tarplant may occur in grassland habitat on the buffer lands.

The presence of Congdon's tarplant on site does not represent a major biotic constraint to the development of land-use alternatives on Plant lands. However, potential impacts to this species may be considered significant under the California Environmental Quality Act (CEQA) and some mitigation and/or avoidance measures may be required. The appropriate level of mitigation for impacts to Congdon's tarplant would be determined on a case-by case, project-specific basis.

A number of additional special-status plant species including California sea blite (*Suaeda californica*), Contra Costa goldfields (*Lasthenia conjugens*), Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), San Joaquin saltbush (*Atriplex joaquiniana*), Pt. Reyes Bird's-beak (*Cordylanthus maritimus ssp. palustris*), caper-fruited tropidocarpum (*Tropidocarpum capparideum*), alkali milk-vetch (*Astragalus tener* var. *tener*), western leatherwood (*Dirca occidentalis*) and hairless popcorn-flower (*Plagiobothrys glaber*) have a very low potential to occur on Plant lands. Previous biological studies conducted on Plant lands by H. T. Harvey & Associates in 1998 and 2003 (H.T. Harvey & Associates 1998 and H. T. Harvey & Associates 2003) included special-status plant surveys throughout much of the Plant lands. These surveys documented the absence on-site of the special-status plant species listed above. Although the California seablite and Contra Costa goldfields are federally-listed plants, the negative survey results for these plant species, and the seven remaining non-listed species above, strongly suggests that these plants do not occur on site.

Special-Status Wildlife Species

As described in the 1998 Biotic Constraints Analysis, several special-status wildlife species may occur on the Plant lands (H. T. Harvey & Associates 1998). For many of these species, no impacts considered significant under CEQA would be expected as a result of any change in land use on the site. For other species, relatively minor mitigation, such as pre-construction surveys, would be required. The only species that would require avoidance or mitigation at a level that might be considered a constraint are the Burrowing Owl (*Athene cunicularia*) and the salt marsh harvest mouse (*Reithrodontomys raviventris*).

Burrowing Owls occur in the southern portion of the Plant lands, where open grassland habitat occurs. This species uses ground squirrel (*Spermophilus beecheyi*) burrows for breeding

(typically between February and August), and for shelter throughout the remainder of the year. Throughout California, suitable breeding habitat for Burrowing Owls has declined dramatically as a result of development, and the Burrowing Owl is considered a Species of Special Concern by the CDFG. To prevent the need to list the species under the Federal or California Endangered Species Acts, the CDFG strictly regulates this species, and requests substantial mitigation for impacts to Burrowing Owls.

In 1997, five pairs of Burrowing Owls were relocated from the former 3COM site south of Highway 237 to the western corner of the Plant lands (H. T. Harvey & Associates 1997). This relocation was conducted under the auspices of the CDFG, with an agreement for a three-year monitoring program (CDFG 1997). No permanent conservation easement was established for these owls, although the City currently manages this area for Burrowing Owls as the Burrowing Owl Management Area (Figure 4). Burrowing Owls are also known to occur at other locations on the buffer lands. Some of these locations are mapped by the CNDDB (Figure 10), although there are additional locations mapped in the City's GIS layers. All non-native grassland and ruderal habitat on Plant lands could provide suitable habitat for Burrowing Owls. Any Burrowing Owls on the site would be subject to the same regulatory considerations: impacts would not be allowed during the breeding season, and relocation or habitat loss would require mitigation and approval by the CDFG. However, these requirements should not pose a substantial constraint to future uses of the site assuming that ample space remains on the buffer lands for future mitigation.

The salt marsh harvest mouse is listed as Endangered under both the Federal and California Endangered Species Acts, and is also listed as Fully Protected by the CDFG. Salt marsh harvest mice have been found in pickleweed marshes at the SCVWD Salt Marsh Harvest Mouse Mitigation Site and at the Zanker Road Landfill Mitigation Site. (H.T. Harvey & Associates 1996). This species could potentially also occur in other pickleweed habitat on Plant lands. Suitable habitat for the salt marsh harvest mouse comprises dense patches of pickleweed (even relatively small patches) that are connected to other pickleweed habitat via vegetated lands. If any future project would impact suitable habitat on-site, impacts to salt marsh harvest mice would need to be considered. Even isolated, sparse patches of pickleweed that would be impacted by proposed projects should be examined by an expert to determine if they constitute salt marsh harvest mouse habitat. Implementation of mitigation measures would be required to compensate for salt marsh harvest mouse impacts, as well as consultation with the USFWS, which regulates federally-listed species. If a federal nexus is involved in the proposed project (such as a USACE permit), consultation would occur per Section 7 of the Federal Endangered Species Act (FESA); if no federal nexus is involved, consultation with the USFWS would occur per Section 10 of the FESA. Although these consultations could potentially require a substantial amount of time, the presence of the salt marsh harvest mouse does not pose a substantial constraint to future uses of the site.

Bird Use of Sludge Ponds

The Biosolids Lagoons on the Plant lands provide important habitat for shorebirds and other waterbirds. Based on a study conducted by the San Francisco Bay Bird Observatory in 1997, up to 1,200 birds may use one pond on a given day for foraging and/or roosting, and the average winter abundance for all biosolids lagoons was more than 6,000 birds (H. T. Harvey &

Associates 1998, Appendix C). More birds used the lagoons during high tide (particularly during spring), although use was fairly high during both high and low tide, and throughout the year. These lagoons are also used by breeding Black-necked Stilts (*Himantopus mexicanus*) and American Avocets (*Recurvirostra americana*). In July 1998, 81 Black-necked Stilt nests or broods were counted at these lagoons (Steve Rottenborn, pers. obs.). Most of the birds using these lagoons have no special regulatory status, but given the relative importance of the biosolids lagoons to shorebirds and other waterbirds, loss of these lagoons as potential roosting or foraging habitat could be significant. The relative importance of these biosolids lagoon will be potentially modified by proposed alteration of habitat for shorebirds and waterbirds on a regional scale as a result of the South Bay Salt Pond (SBSP) Restoration Project. If the current biosolids lagoons are relocated, it is unlikely that any impacts to shorebirds would occur. However, environmental review, and potentially mitigation, would be required to ensure that habitat alteration would not have significant effects on shorebirds or other waterbirds in the South Bay. Nonetheless, this biosolid lagoon modification is not likely to pose a substantial constraint to future alteration of Plant lands.

Coyote Creek Flood Control Project Modifications and Habitat Mitigation Area

The SCVWD constructed the Lower Coyote Creek Flood Control Project between 1987 and 1989. Implementation of this project included mitigation for impacts to salt marsh harvest mouse habitat, open water/waterbird habitat, and riparian habitat due to the construction of the flood control levee. These mitigation sites are located within the Coyote Creek corridor and the SCVWD holds a conservation easement for this area (Figures 4 and 8). A 16.5 acre waterbird pond was constructed just downstream of the weir between Coyote Creek and the Coyote Creek Bypass Channel to mitigate the loss of open water habitat provided by the levee construction in portions of A18 (CH2MHILL 1994) (Figure 8). This brackish water pond is managed to provide waterbird habitat. A salt marsh harvest mouse mitigation area is also located within the Coyote Creek Bypass Channel corridor between the severed portions of Pond A18 and the waterfowl pond (Figure 8). The salt marsh harvest mouse mitigation area, part of which was formerly used as a bomb disposal site by the City, was revegetated with pickleweed to provide cover for the salt marsh harvest mouse. This area is connected to the Coyote Creek Bypass Channel by culverts and tide gates, which are used to manage water levels, flows, and salinities to optimize conditions for pickleweed growth. In addition, the SCVWD installed a pair of 48-inch gated culverts through the new flood-control levee, connecting the southwest corner of the salt marsh harvest mouse mitigation area to the Nine-par Channel that runs between the biosolids management area and Pond A18. The pickleweed habitat in the channel potentially functions as a dispersal corridor for salt marsh harvest mice between the SCVWD's mitigation area and non-tidal salt marsh habitat to the west. This hydrologic connection was established to allow vegetation management (i.e. supplemental water) in the ditch. In addition, riparian habitat mitigation is located within the Coyote Creek riparian corridor.

These mitigation sites pose constraints to future projects. Impacts to these mitigation sites would, in turn, require mitigation. However, projects that improve the ecological functions of the riparian and tidal wetland ecosystems in this area such as the restoration of the riparian to tidal wetland transition zone (presented below) should be readily permittable.

LAND-USE OPPORTUNITIES

The following section summarizes land-use opportunities for Plant lands organized by the following opportunities:

1. Plant expansion opportunities
2. Water recycling facilities expansion
3. Interim land uses for plant expansion area and buffer lands
4. Biosolids odor reduction opportunities
5. Riparian corridor widening along lower Coyote Creek
6. Restoration of riparian to tidal-habitat-transition zone along lower Coyote Creek-Coyote Slough
7. Flood protection improvements-South San Francisco Bay Shoreline Study
8. Co-composting facility
9. Regional biosolids processing facility
10. Biosolids monofill
11. Biosolids or co-compost for tidal marsh restoration
12. Solar power generating facilities
13. Soil stockpiling for construction projects
14. Public access, and
15. Environmental education.

An overview of each land-use opportunity is provided along with a summary of the relationship of the opportunity to the six planning goals. This is followed by a summary of the constraints associated with each opportunity. The approximate capital cost of the various opportunities is ranked from Low to Very High in the qualitative rating matrix provided in the last section of this report. During the alternatives development phase, these opportunities will be integrated in various combinations and layouts.

PLANT EXPANSION OPPORTUNITIES

Purpose of this Section

The purpose of this section is to address the opportunities for expansion of the Plant itself. The primary mission of the Plant, and the reason for its existence and ownership of the Plant lands, is to serve the communities that depend on it for sewage treatment. A key element of the Land-Use Master Plan is the need to address opportunities for expanding the Plant itself, consistent with commitments to serve the planned growth of the cities of San José and Santa Clara, and the tributary agencies. Given the critical nature of the service provided, the Plant's ability to function effectively overrides all other factors associated with use of the Plant lands. This section identifies the land on which future expansion can best occur.

Overview of Land-Use Requirements

The Plant buffer/expansion lands are circumscribed by sensitive land uses and also contain a variety of easements (Figure 4). Adjacent areas least sensitive to odors and visual impacts are

the natural habitat and open waters to the north, upwind of the Plant facilities. The nearest sensitive receptors are located in the residential neighborhood of Alviso, approximately 3/4 of a mile from the plant. The nearest sensitive receptors downwind of the Plant facility in the prevailing wind direction are approximately one-half to three-quarters of a mile from the site, in the City of Milpitas.

Lands reserved for expansion of Plant facilities are ranked from a land-use planning standpoint[2] according to four criteria:

1. physical relationship and proximity to the Plant operation(s)/functions being expanded
2. distance to sensitive users that could be impacted by the specific characteristics of the operation/function being expanded
3. relationship of the site to the prevailing wind directions; and
4. on-site conditions (especially the presence/absence of special status species and/or other regulated or sensitive habitats).

It is assumed that most Plant functions should be accessible by foot from other Plant functions. From both an efficiency and management viewpoint, therefore, locations on the other side of the adjacent public streets are considered less appropriate than those within the arc of Zanker Road/Los Esteros Road. Plant operations that could generate odors, or involve use of substantial quantities of hazardous materials, should be located the greatest distance possible from sensitive users, within the constraints of criterion #1 (proximity to the function being expanded). Consideration must also be given to the likelihood that odors or air-borne gases could be carried by the prevailing wind to more distant receptors (criterion #3).

Some consideration of visual and aesthetic values may also be appropriate. The Plant lands are bordered by a power generating facility (Calpine), an electrical substation, and a number of office/industrial buildings north of Highway 237, the Valley Transportation Authority bus barn/maintenance facility to the southeast, and industrial parks to the south and southwest of Highway 237. The Highway 237 freeway forms the most southerly boundary of the Plant lands and is a major access point to "Silicon Valley". Appropriate landscaping and physical design would need to be considered for future expansion visible from Highway 237.

Land Use Plans ands Policies

Existing General Plan land use designations are not sufficient protection to ensure long-term availability of Plant lands for future Plant expansion needs. As discussed above, there is a great deal of discretion allowed in deciding what is consistent with the current "Public/Quasi-Public" designation. While vacant land may attract near-term uses, the planning process also requires a long-term planning focus. Zoning is not a sufficient protection for land that is owned by the City and used for municipal purposes. The City is not subject to its own zoning code.

It would be appropriate to amend the General Plan to identify Plant lands as specifically planned for Plant-related purposes, reflecting the overarching importance of the Plant to the community as a whole. Even the buffer lands could and probably should be designated as being appropriately used only for uses that are related to, compatible with, and/or protective of the Plant itself. Interim uses, such as those discussed below, would only be allowed if they are

found to be fully consistent with existing and future Plant operations. In the event of conflict, the Plant's interests would prevail.

Existing General Plan land use designations do not reflect the unique characteristics of the Plant as a regionally significant land use, or the combined flexibility and permanence needed for Plant lands. It is recommended that Plant staff work with General Plan staff to identify a new land use category or categories to be incorporated into the Alviso Specific Plan and, ultimately, into the General Plan itself.

Expansion of Water Treatment Facilities

The adopted City Council Policy for Plant lands estimates that approximately 200 acres would be required for Plant expansion in the future (City of San José 2000). The expansion estimate does not include expansion for biosolids processing or the 31-acre South Bay Water Recycling expansion area east of Zanker Road (Table 2). The following discussion includes the assumption that the 200 acres would not include these facilities. Given both criteria and the presence of public streets on two sides of the existing Plant water-treatment facilities, the optimum Plant expansion area would be an arc of land starting on the south side of Los Esteros Road west of the existing Plant facility boundary, and ending on the west side of Zanker Road, south of the existing Plant facility. Figure 3 illustrates the general location of this optimum 200-acre expansion area. This relatively compact block of open land is physically close to the Plant facilities and would not be separated from existing processing functions by a public street.[2] The inner band of the arc (*i.e*, the area closest to existing Plant operations) is also reasonably distant from the nearest sensitive receptors. Although the Alviso neighborhood is generally upwind from the Plant, placing future processing and odor-generating activities farther from Alviso would be advisable. Other sensitive receptors are located even farther from the Plant site than the Alviso residential neighborhood and already have more significant barriers (Highway 237, Coyote Creek) between them and the Plant.[3] In addition, this proposed expansion area is preferable from a biological standpoint based on the general absence of regulated habitats in this area and the presence of rather low-quality, non-native, grassland habitat.

This optimum expansion area does not include expansion of the current biosolids lagoons and drying beds (Figure 3). A recently constructed wet-weather detention pond is located within the optimum Plant expansion area and could be incorporated into design of the future expansion.

The precise configuration of facilities built on the 200 acres would require more detailed study than this broad-brush land-use evaluation. Land-use principles alone would place the facilities likely to cause off-site impacts (odors, gases, hazardous materials) nearest the existing facilities,

[2]Because the Plant is operated by the same entity that owns and operates the public streets, it is acknowledged that the street(s) could be moved to accommodate the Plant, if desired This option was not actively considered as part of this analysis. There doesn't seem to be any advantage to moving the streets (Los Esteros/Zanker) but lots of complications because of all the easements that are on, under, adjacent to, or accessed via the streets. In addition, none of the opportunities identified would seem to benefit from moving the streets. If some future land use proposal would benefit significantly from moving the street, it could be considered then.

[3] There are sensitive receptors closer to the biosolids lagoons than the residences in Alviso are to the Plant.

within an inner ring of expansion. New buildings or facilities least likely to cause off-site impacts could be placed in the "outer ring" of expansion, especially to the west. Expansion of other Plant cctivities and distance to sensitive receptors is only relevant to those Plant functions that generate off-site impacts.[4] Plant offices, employee or visitor parking, and laboratories would have minimal off-site impacts and could be located either west or south of the Plant facilities without significantly impacting sensitive receptors. The primary considerations would be functional by placing the buildings or facilities near the existing or proposed Plant facilities they are supposed to relate to. Environmental impacts, however, would also be relevant since there are sensitive habitats, easements, a major waterway, and other existing conditions that include an old sanitary landfill and old biosolids, on the Plant property.

If expansion space is necessary for activities related only administratively to the on-site Plant operations (*e.g.*, offices for inspectors of off-site facilities), locations other than the optimum Plant expansion area may be acceptable or "secondary" opportunities. If the occupants of the new buildings rarely need to interact with other Plant staff or operations, facilities could be located across the public street from the Plant facilities, in one or more freestanding buildings with adjacent parking. Possible locations could include the residual Nine-Par Landfill site (north of Los Esteros Road) and the triangle of property north of the SBWR pump station (Figure 3). Outlying facilities that encumber portions of Plant lands would introduce future constraints, at whatever their location, and further reduce operational efficiencies (including services such as mail delivery and building maintenance). Therefore, outlying locations are functionally inferior to developing Plant administrative and operational facilities in close proximity to each other and would not be categorized as optimum expansion sites.

Expansion of the Biosolids Lagoons/Drying Beds

The optimum locations for expansion of the current biosolids lagoons/drying beds (based on Criterion #1 alone) would appear to be either the old biosolids drying bed area, the southern portion of Pond A18, and/or the triangle of land immediately east of Zanker Road and north of the existing South Bay Water Recycling operation (Figure 3). Since the latter location is inconsistent with Criterion #2 (moving an odor source closer to residential uses south of SR 237 and to downwind receptors in Milpitas), it is less suitable than the first two options.

Criterion #4, environmental impacts, is also relevant to use of the old biosolids drying beds. The old biosolids that are still present in the old drying beds would have to be relocated. The physical and regulatory issues associated with their removal would comprise part of a more in-depth study of the property.

Relationship to Land-Use Planning Goals

The consistency of the Plant expansion opportunities discussed below with the Plant's land-use planning vision and goals include the following.

[4]This statement speaks only to factual impacts. Perception may affect decision-making in ways not directly related to physical impacts.

Flexibility for Plant Uses. Goals Rating (+). Since this particular goal is about the compatibility of land-uses with Plant operations and maintaining flexibility for the Plant, expansion of Plant operations is inherently compatible with this goal. The opportunities address the Plant's expansion, based on four criteria. The first criterion is the location and relationship of expansion areas to the basic Plant functions they are expanding. The opportunities are, therefore, inherently compatible with this goal. The Optimum Expansion Area identified proximate to the existing Plant facility would be more consistent with the goal to operate more cost-effectively than some of the variations also discussed.

Regulatory Compliance. Goals Rating (+). As development continues to occur in the Plant's service area, Plant expansion would eventually be required to maintain regulatory compliance with the level of wastewater treatment required by law. The expansion onto now vacant Plant lands is, therefore, consistent with this goal. It is currently planned that part of the expansion will include advanced treatment of effluent, which will improve the quality of the recycled water, making it usable by a greater number of users in the larger community. That would also be consistent with this goal.

Worker and Community Safety. Goals Rating (+). Plant expansion and associated modernization would likely make the Plant safer for workers and the community. As discussed below, locating the operational functions as far as possible from sensitive receptors reduces the risks of such use, should it continue.

Habitat Protection and Restoration. Goals Rating (-). Plant expansion could impact sensitive biotic resources. The existing sensitive habitats proximate to the Plant could be protected and/or the impacts could likely be mitigated on-site even with Plant expansion. This could include designing expansion to avoid impacts to wetland and Burrowing Owl habitat or creating/restoring these habitats in other locations on the Buffer Lands.

Good Neighbor and Public Value. Goals Rating (0). The utilization of land closest to the existing Plant facilities for expansion, and the expansion and movement of the current biosolids lagoons could be accomplished with neutral and/or beneficial effects on nearby sensitive receptors. Consistent with this goal, open buffer of land adjacent to SR 237 can be utilized for visually attractive ecological features such as constructed wetlands.

Economic Opportunities. Goals Rating (0). It is not possible in this report to foresee whether or not the future Plant expansion(s) would generate revenue or reduce costs.

Capital Cost

The capital cost for the Plant expansion opportunity is rated as Very High (>$100 million).

Constraints

Existing Encumbrances and Past Uses. Existing or past uses of parts of the site by the Plant itself may have resulted in physical conditions that would, in their current state, be incompatible with future expansion (such as the inactive biosolids lagoons). An old sanitary landfill is known to exist on part of the property. Other existing conditions, including easements and infrastructure

owned by others, occur on and adjacent to the optimum expansion area and would limit its use to some extent (Figure 4). It is believed that most of these adverse conditions can be avoided or mitigated to less than significant levels.

Biology. No major biotic constraints currently exist to Plant expansion within the areas described above. However, the proposed expansion areas do comprise Burrowing Owl habitat. As noted above, any Burrowing Owls on the site would be subject to the following regulatory considerations: impacts would not be allowed during the breeding season, and relocation or habitat loss would require mitigation and approval by the CDFG. Habitat mitigation requirements could potentially be met on site depending on the acreage of habitat impacted relative to the acreage of habitat available for mitigation. Off-site mitigation may be necessary depending on the Plant expansion scenario.

Although the Congdon's tarplant, a species of special-status (CNPS List 1B) may occur in this location, the presence of this plant in the Buffer Lands would not represent a major biotic constraint for future Plant expansion.

Treatment Capacity. Plant expansion is also constrained by the maximum treatment capacity of 167 mgd.

WATER RECYCLING FACILITIES EXPANSION

Overview and Benefits

The City and the SCVWD have a desire to increase water recycling in Santa Clara County. However, recycled water produced at the treatment plant has relatively high salinity, which limits its usability. Moreover, use of recycled water may be limited in areas where it could percolate into groundwater aquifers used to supply drinking water. Therefore, advanced treatment facilities are currently being considered as one method to improve the quality of the Plant's recycled water.

Approximately 31 acres of Plant land along the east side of Zanker Road has been set aside for potential future Plant expansion, including the possibility for advanced recycled water treatment facilities. If built, advanced treatment facilities may include membrane filtration processes, including microfiltration or ultrafiltration followed by reverse osmosis. Advanced oxidation using high-intensity, ultraviolet irradiation and peroxidation may also be constructed downstream of the reverse-osmosis process to provide disinfection and to remove recalcitrant compounds of concern such as N-nitrosodimethylamine and 1,4-dioxane.

Relationship to Land-Use Planning Goals

This opportunity would contribute to the following land-use goals.

Flexibility for Plant Uses. Goals Rating (+). Advanced treatment of the Plant's recycled water would potentially expand the market that could use this water, serving a broader cross-section of the public. Increased recycling of the Plant's effluent would reduce wastewater

discharge to the South Bay giving the Plant more flexibility to treat additional wastewater in the future while meeting the RWQCB's discharge requirements.

Regulatory Compliance. Goals Rating (+). Expansion of the recycled water system would reduce the amount of fresh water discharged into South San Francisco Bay, thereby reducing potential adverse impacts of fresh water on salt marsh habitat. The discharge permit for the Plant currently limits discharges of freshwater during the dry season to 120 mgd.

Worker and Community Safety. Goals Rating (0). Expansion of the recycled water system is not expected to have significant impacts or benefits to worker and community safety.

Habitat Protection and Restoration. Goals Rating (0). As discussed above, expansion of the recycled water system may benefit salt marsh habitat in South San Francisco Bay due to reduced discharges of freshwater. However, expansion of water recycling facilities could impact sensitive habitats at the location of improvements.

Good Neighbor and Public Value. Goals Rating (+). Expansion of the recycled water system along with advanced treatment would expand the cross-section of the community that could utilize this resource. Recycled water also improves the reliability of the water supply through diversification of sources. Moreover, recycled water is relatively drought proof and is less vulnerable compared to imported water that is conveyed across seismic faults in pipelines and canals. In addition, this opportunity is not expected to have significant impacts to the surrounding community.

Economic Opportunities. Goals Rating (+). Expansion of the recycled water system would increase the water supply available to Santa Clara County, which is critical for economic development.

Capital Cost

The capital cost for this opportunity is rated as Very High (>$100 million).

Constraints

Burrowing Owl Habitat. Burrowing owl habitat is present within the proposed recycled water expansion area. Impacts to this habitat would require mitigation, which might be accommodated on-site within the buffer lands.

INTERIM LAND USES OF THE BUFFER LANDS AND PLANT EXPANSION AREA

Since the primary land-use planning goal is to maintain flexibility for future Plant uses, it would be useful to identify appropriate interim land uses for the Plant expansion area and buffer lands. An interim land use would be temporary in nature and would not interfere with ongoing Plant operations and/or limit future use of the land for Plant core purposes. An interim land use should meet as many of the secondary land-use planning goals as possible. The following section describes interim land-use opportunities, including mini-recreation facilities, agriculture/farming, constructed wetlands complex.

The mini-recreation facilities discussed below would enhance public access and recreation in the community and the farming option would provide some economic benefit to both the Plant and the farmers. However, the Plant currently uses chlorine gas for disinfection, which is hazardous to the public. For this reason, these interim land uses are not appropriate in the near-term. However, the Plant intends to phase out chlorine gas treatment and replace with liquid hypochlorite within approximately five years. Therefore, since the Master Plan will be a 50-year plan, we included these opportunities to enhance public access and recreation over the long-term.

Mini Recreation Facilities

Overview and Benefits. There are a number of public activities for which there consistently seems to be inadequate space available in San José. Among them are public recreation facilities, especially for specialized activities. While facilities such as playfields for team sports (such as soccer, baseball/softball, football, etc.) could require minimal improvements and would use substantial quantities of recycled water, they would probably not be suitable on Plant lands. Playfields require relatively large areas be a future constraint to Plant expansion flexibility. Moreover, users of playfields typically become heavily vested in the facilities and acquire an "ownership" mindset that would preclude future elimination of the fields. This could be a severe restriction on the flexibility of future Plant expansion.

Users of recreational facilities could find odors from the Plant operations bothersome and register complaints. The optimum location for these facilities, however, would be on that portion of Plant lands that is not subject to odors carried by prevailing winds – the southwest quadrant of the Plant lands. In addition, the mini-recreational uses listed below are mostly specialized activities that are in great demand and short supply. Users of most of these facilities tend to be focused on the purpose of the facility and less critical of its perceived shortcomings. In order to minimize odor complaints, the Plant should consider informing all users of the potential for odors, as well as posting on-site signs informing the public that anyone using the facilities accepts the occasional annoyance of Plant-generated odors.

A substantial public presence on Plant lands could place more people at risk from potential chemical leaks. Since the Plant is planning to phase out gaseous chlorine and sulfur dioxide over the next five years, these interim recreational uses may not be appropriate until that risk is eliminated.

More viable interim uses would be those that could occupy small sites and be located on fringe areas, outside of the proposed expansion areas. Such interim uses should be compatible with irregularly shaped sites, require little to no physical improvements, and require minimal maintenance. Relatively small, inexpensive facilities would be viable interim land uses because they could be easily relocated, if necessary, to allow space for improvements that support the Plant's core purpose.

There is an existing demand within the community for more community gardens and more dog parks. Both types of uses could be placed on one or more relatively small pieces of land (one-half acre or more, for example) and would require little more improvement than perimeter fences and an irrigation system. Most of the parking would occur on public streets, since these are very small facilities. However, the list below does include small parking lots. Both types of facilities

could use recycled water. Turf would probably be planted for a dog park, and pathways (decomposed granite or gravel) may be desirable for the community gardens. The Guadalupe Gardens in downtown San José is establishing a community gardens that includes use of recycled water. A non-profit group, Friends of Guadalupe River Park, is managing a grant for implementation of this project that includes preparation of a handbook for using recycled water in a community garden. Lessons learned from this project could be applied to a similar project on Plant lands.

There may be other small "pocket" recreation activities that could be accommodated on Plant lands. Plant Staff may wish to confer with Parks and Recreation Staff regarding current demands for relatively small community activity areas. Potentially appropriate interim recreation uses might include:

- Communities gardens
- Dog Parks
- Picnic facilities
- Small playgrounds
- Volleyball courts
- Par courses
- Archery range
- Putting greens
- Fishing ponds
- Small skateboard park
- Informal grass playfields, no equipment
- Model boat pond
- Horseback riding, including lessons
- Historic battle re-creations
- Small parking lots as needed for recreation sites

No formal seating, including bleachers, should be provided in order to discourage groups from gathering. There are four general areas with potential for recreation activities:

- Lands at and near the northwest and northeast intersections of Highway 237 and Zanker Road. The west corner is the most promising since the east corner is currently planned as a South Bay Water Recycling expansion area. These lands are relatively remote from Plant operations and have good public street access.

- Remnant areas between the driver training facility and the Plant expansion area. These areas may be small and perhaps difficult to access but would be useful for small low intensity activities

- South side of Los Esteros Road, west of Plant Primary Operations. This site is several acres but its usefulness may be somewhat limited by the railroad easement which constricts its depth as well as the adjacent wetlands and burrowing owl habitat. Introducing a recreation activity at this location, however, would have the additional public advantage of proximity to the Alviso village area.

- In addition, should any of the properties currently being used for private purposes, such as the horse ranch, become available, they also could be considered for recreation use.

Unfortunately, not enough is known about the terms and conditions of the leases and easements in these areas to determine anything definitive about the potential for public access areas.

To educate users about their "host", all-weather, on-site signage could be provided that points out nearby places of interest (including the nearby Don Edwards National Wildlife Refuge Environmental Education Center, any Plant ecological restoration efforts, the Guadalupe River, types of habitat visible from the vantage point, and features of the wastewater treatment plant facilities). The signs could also explain that the recreational facility is provided courtesy of the Plant.

Relationship to Land-Use Planning Goals. The consistency of mini recreation facilities with the land-use planning goals includes the following.

Flexibility for Plant Uses. Goals Rating (-). Because the first criterion for these mini recreation facilities is small size, they would only be located where their existence is considered unlikely to be a constraint, either physically or functionally. These facilities could be easily and cost-effectively relocated because their construction would include only minimal on-site improvements. This opportunity is, therefore, compatible with this goal. Nonetheless, recreational facilities always attract adherents; therefore, this opportunity does present a risk that facility users might object to relocation or to removal of the recreational use if another compatible location could not be found.

Regulatory Compliance. Goals Rating (+). Many of the uses possible under this opportunity, including dog parks and community gardens, would use recycled water for irrigation. This opportunity is therefore, consistent with this goal.

Worker and Community Safety. Goals Rating (0). The creation of mini-recreation facilities on Plant lands would be consistent with the goal of reducing use of toxic materials on-site. These land uses would be neutral with the achievement of the goal, since they would neither minimize nor replace the use of toxic materials.

Habitat Protection and Restoration. Goals Rating (-). Mini recreation facilities could impact sensitive biotic habitats. However, such facilities can and should be located consistent with the goal of habitat protection and restoration. In particular, dog parks should be designed and located to preclude canine threats to wildlife. For example, parking for dog parks should be located very near the gate(s) to the dog parks.

Good Neighbor and Public Value. Goals Rating (++). The residential uses in San José nearest to the Plant are in Alviso and North San José/Rincon. Residents in both areas would have the best access to these pocket-recreation facilities. If the Plant were to be explicitly involved in "marketing" the facilities to nearby residents, it would be an opportunity to establish a more positive relationship with residents of the City. All of the mini recreation uses would be

consistent with the "public value" portion of this goal since all of them provide opportunity for public enjoyment of Plant lands. This opportunity is consistent with this goal.

Economic Opportunities. Goals Rating (-). Most of the mini recreation facilities would neither generate revenue nor reduce Plant costs. In fact, such facilities would require long-term maintenance. A few of them, such as horseback riding lessons, historic battle recreation, and perhaps facilities such as archery ranges, could generate income for the Plant.

Capital Cost. The capital cost for the mini-recreation facility is Low (<$1 million) per facility.

Constraints. The following general constraints would be associated with all or most of the mini recreation uses listed above:

1. The presence and use of gaseous chlorine and sulfur dioxide represents a risk of injury or death in the event of an accidental release. The Plant is presently planning to eliminate gaseous chlorine and sulfur dioxide from the site within the next five years. In the meantime, mini recreation facilities on Plant lands may be inappropriate.

2. There are a number of odor sources in the general Alviso area, including the Plant. The Plant should be proactive about informing users of all of these future facilities that odors do exist in the area and users of these facilities should be tolerant of them. This could include signing ("Welcome to the San José/Santa Clara Water Pollution Control Plant Lands. Please remember that you are a guest of the Plant here. Occasionally you may notice odors that could be coming from the Plant, the mud flats of the Baylands, and other sources in this area"), user agreements for facilities that must be reserved, and reminders in printed materials (such as Parks and Recreation catalogs or directories). The public planning process for each of these facilities can also be used to remind the public and decision makers that the facilities may be subject to intermittent odors.

   Facilities should be sited relative to odor sources and prevailing wind direction so as to minimize odor effects.

3. Community garden locations would be limited to portions of the buffer lands and Plant expansion areas with topsoil capable of supporting target crops, otherwise imported topsoil would be required, and;

4. Mini recreation facilities should be designed to avoid, minimize and mitigate impacts on existing wetland and Burrowing Owl habitat.

Agriculture

Overview and Benefits. "Agriculture" is defined narrowly in this report as "farming", the process of growing food plants or other plants, or "grazing", allowing domestic farm animals to feed on grasses or grains grown on site. This definition is not intended to exclude flower growing, but it should be noted that flower cultivation typically includes a greater use of agricultural chemicals than should be considered acceptable on Plant lands. Agricultural activities on Plant lands should not include any significant buildings or structures. Minimal

buildings or structures deemed necessary for a particular private farming operation should be allowed only if they clearly can be amortized over the term of the lease, and their location, size, use and ultimate disposition is detailed in a lease agreement.

Farming, horse boarding and grazing have been interim uses of Plant buffer lands for many decades and should continue to be considered preferred interim use options as long as a particular operation can be relied upon to maintain Plant security and to avoid contaminating Plant land soils and habitats. Controlling the operations and conditions of private agricultural uses should be relatively easy since private uses will in most cases be permitted through a lease agreement. Should the Plant decide to engage in agricultural activities directly, it should observe the same protective practices it might impose on a private user.

Agriculture represents three positive benefits for the Plant: it is simple to ensure that any non-Plant agricultural uses are temporary, since the term of use would be specified in the lease agreement; farming operations can make use of substantial amounts of recycled water; and the Plant can realize some income from leasing land for private agricultural activities. All other things being equal, the Plant should give preference to farming proposals that would utilize greater amounts of recycled water.

Care should be taken, however, to avoid the use of toxic substances in fertilizers or other products that could compromise the quality of soil, groundwater and/or runoff from the farming sites. Grazing should be located only where animal wastes will not significantly affect runoff or discharge. Particular care should be taken to avoid any negative impacts to various Plant land habitats or wetlands as well as discharge to the Bay. Airborne toxics should be avoided in all cases. Use of potentially undesirable substances and products can be regulated through lease terms as can operational requirements for maintaining Plant security.

Farming can be considered an excellent community benefit because it can provide produce or turf for local use, with minimal transportation costs for delivery of fresh product to Bay Area tables and yards. Grazing also will result in shorter trips for transporting animals as well as shorter trips for hobbyists to visit and care for their animals. In addition, both farming and grazing provide some scenic and educational benefits.

Relationship to Land-Use Planning Goals. Farming and grazing can be found consistent with most of the Land Use Planning Goals:

Flexibility for Plant Land Uses. Goals Rating (0). Because agricultural uses will most often be privately operated and regulated by the terms of a lease, they can be fully responsive to the future needs of the Plant. The lease should specify: how long the farming or grazing operation may use the land; when and/or under what circumstances those activities must be discontinued; and what operational or other requirements must be met. Farming and grazing on buffer lands have historically been located in the southern portions of the Plant lands and have been able to coexist, and not interfere, with Plant operations. Any new farming or grazing activities should also be located primarily on buffer lands south of Los Esteros Road.

Regulatory Compliance. Goals Rating (+). Farming and pasture lands can use significant amounts of recycled water, which would assist the Plant compliance with regulations requiring it to limit discharge into the Bay. If deciding among several agricultural proposals, the Plant should give priority to those that use greater amounts of recycled water.

Worker and Community Safety. Goals Rating (0). While farming and grazing have some potential for introducing toxic substances onto Plant lands and, perhaps to a lesser degree, into the surrounding community, the Plant can minimize any such impacts by setting appropriate standards in the lease for minimal use or avoidance of potentially harmful substances. Requiring all farming operations to be organic would result in compliance with the worker and community safety goal for farming. Grazing could also meet the goal if it is located to avoid contamination of sensitive sites by animal waste and uses organic methods for growing pasture and maintaining animals.

In addition, there has been no evidence that any farming or grazing enterprise has ever compromised Plant security. In the future the Plant may want to incorporate security provisions into lease conditions.

Habitat Protection and Restoration. Goals Rating (0). As long as agricultural activities are limited to sites without significant habitat, and farming/grazing practices are selected for compatibility with nearby sensitive habitats, they can be considered to have a neutral effect on habitat protection and restoration. While farming and grazing have some potential for negatively affecting habitats, those impacts can be avoided by precluding the use of questionable agricultural products and practices in the lease agreement. Organic practices can be required of all farming or grazing operations on Plant lands.

Good Neighbor and Public Value. Goals Rating (+). Farming and grazing are typically perceived as good neighbors if they are far enough away that homes, schools, parks, and offices aren't affected by the noise, odor, dust or toxics that frequently accompany farming or grazing. On the other hand, people seem to enjoy having farmlands and grazing near enough that they can drive by and see them. The Plant lands are likely to satisfy on both counts and in fact have probably been doing so for some decades.

More substantively, farming on Plant lands can efficiently provide produce, turf, etc. for local use with minimal transportation costs and fresher product for Bay Area tables and yards. Grazing can provide convenient options for South Bay residents to engage in raising or keeping a variety of farm animals for recreation, food or other products. In addition, farm operations on Plant lands can provide some scenic and educational benefits for South Bay residents. Growing crops, pastures and animals are typically pleasant to view and can provide young observers, in particular, some understanding of where certain foods come from.

Economic Opportunities. Goals Rating (0). Ostensibly, farming and grazing would seem to present an economic opportunity for the Plant via the collection of rent. However, City efforts to lease to farmers over the past several years have shown that the City would likely have to pay farmers rather than obtaining income. Therefore, this opportunity is at best cost neutral (i.e. farming could replace the existing mowing contract). The Plant may also wish to engage in its

own farming activities as a means of directly supporting its own objectives, for example, by using excess recycled water.

Capital Cost Ranking. The capital cost ranking for this opportunity is neutral at best as summarized above.

Constraints. Farming and grazing present virtually no constraints to the continued operation of the Plant or to the flexibility desired for responding to future Plant needs. The scale, term, location, and impacts of private activities can be controlled through lease agreements.

Existing Plant land conditions and objectives do pose some constraints on the potential locations and operational characteristics of agricultural uses, and, therefore, may make Plant land leaseholds less attractive to potential lessees and/or may result in lower rental income for the Plant. In addition to a probable requirement for organic farming and grazing practices and the need to otherwise avoid contaminating sensitive Plant habitats and wetlands, potential farmers may find high salinity Plant land soils inhospitable to some types of crops. Plant lands may be unsuitable for some types crops and/or may result in higher operational costs to amend the existing topsoil.

Constructed Wetland Complex

Overview and Benefits. Historical information suggests that the low-lying, poorly-drained areas surrounding the tidal marshes of the South Bay used to receive substantial freshwater inputs during the winter from creek flood flows and groundwater (San Francisco Estuary Institute (SFEI) 1999). According to SFEI's historical analysis, shallow depressions in the clay soils of this area likely formed a mosaic of seasonal wetland depressions in a band around the South Bay dominated by salt grass (Distichlis spicata) and referred to as the "zone of salt grass" (SFEI 1999). Such seasonal wetlands would have provided important habitat for shorebirds and waterfowl. Bayside seasonal wetlands are now relatively scarce in the region. The existing seasonal wetlands, such as wetlands at the northwest corner of the Plant property, provide foraging habitat for shorebirds, especially during daily high tides that inundate the tidal mudflat foraging habitat of the South Bay. In addition, these wetlands provide fresh water for drinking and bathing and are used by a variety of waterbirds in addition to shorebirds including herons and egrets, waterfowl and gulls. Seasonal wetlands provide resources for wintering birds and during vernal migration, when waterbird numbers are high in the region. Futhermore, willow sausals (dense thickets dominated by native willow and cottonwood tree species) also likely occurred just landward of the zone of salt grass where groundwater was particularly shallow, providing habitat for a diversity of songbirds (SFEI 1999; Collins and Grossinger 2004). These willow sausals would have increased the diversity of wildlife in the bay-to-upland transition zone. In particular, the thickets would have provided breeding habitat for the Salt Marsh Common Yellowthroat (State species of special concern) and stopover foraging habitat for a variety of Neotropical migrants and winter visitors such as Yellow Warblers (State species of special concern). This mosaic of freshwater habitat that once fringed the South Bay has been virtually obliterated by development.

The Plant expansion area and the southerly portion of the buffer lands appear to be located within this historical zone of salt grass and associated seasonal wetlands (SFEI 1999; U.S.

Geological Survey 1850). This portion of Plant lands is one of the few remaining locations where it would be possible to recreate a seasonal wetland mosaic adjacent to the tidal marshes of the South Bay. A mosaic of seasonal wetlands and/or willow sausals could be constructed by excavating shallow, naturally configured depressions within the existing upland habitat. Treated wastewater effluent could be utilized as a water source to supplement rainfall to prolong the duration of ponding in Spring (especially in drought years). Treated effluent could also create shallow ponding even in the fall during the fall shorebird migration. It is likely that these wetlands would receive heavy use by shorebirds and other waterbirds during that time of year. The seasonal wetlands would, in turn, provide additional wastewater effluent filtration or perhaps even use secondary treated water, thus providing a potential economic benefit. Since willows and cottonwoods are flood tolerant and exhibit high evapotranspiration rates, created willow sausals could be flood irrigated with wastewater effluent to divert a portion of the effluent discharge from the South Bay.

Relationship to Land-Use Planning Goals. This potential interim land use would meet the land use planning goals as follows:

Flexibility for Plant Uses. Goals Rating (-). It should be possible to create seasonal wetlands that would not fall under the jurisdiction of the USACE by designing these wetlands to rely on Plant effluent as the primary water source. The USACE does not claim wetlands with artificial hydrology. An investigation of groundwater should be conducted to make sure that excavation to construct wetlands would not penetrate through the shallow groundwater layer on-site thereby providing a natural water source to the wetlands. In addition, a wetland delineation, verified by the Corps, should be performed before wetland construction to formalize the baseline conditions (i.e. no Corps jurisdiction present prior to wetland construction).

If these created wetlands would be likely to attract endangered species, it would be possible to obtain a safe harbor agreement.

Such wetlands would attract adherents since they would greatly improve the visual aesthetics and provide visible waterbird habitat. Therefore, there is a very high degree of risk that public adherents might object to relocation or removal of the created habitat.

Regulatory Compliance. Goals Rating (+). A portion of the effluent discharged to the South Bay would be diverted to the created seasonal wetlands, helping to meet the discharge flow requirements.

Worker and Community Safety. Goals Rating (0). Constructed wetlands could create mosquito breeding habitat, this increasing the risk of transmission of mosquito borne pathogens such as West Nile Virus. However, wetland design and long-term management techniques are available to reduce created mosquito habitat and control mosquito abundances. Therefore, this land use opportunity is consistent with this goal.

Habitat Protection and Restoration. Goals Rating (+). As noted above, constructed seasonal wetlands would provide habitat for shorebirds and waterfowl. Such habitat creation would also

help the SBSP Restoration Project's objective to maintain a balance between restored tidal marshes and shorebird habitat.

Good Neighbor and Public Value. Goals Rating (+). A seasonal wetland mosaic would greatly improve the visual aesthetics of the Plant expansion and buffer lands, which is visible from Highway 237 and Zanker Road. The use of treated wastewater effluent in wetland creation would also provide an educational example of the value of wastewater effluent as a community and ecological resource. This opportunity would increase the buffering value of the Plant land by providing a wetland buffer.

Economic Opportunities. Goals Rating (0). If constructed wetlands could substitute for the existing tertiary treatment operations for a portion of the effluent, this would reduce Plant operations costs. However, it is uncertain whether such wetlands could meet the regulatory standards for tertiary treatment and the engineering of treatment wetlands has not yet been developed to nearly the same level of treatment consistency as conventional tertiary treatment.

Capital Cost. The capital cost for the constructed wetland opportunity is rated as Moderate ($1 million - $10 million), assuming that less than 50 acres of seasonal wetlands are constructed

Constraints. This opportunity has the following associated constraints:

1. Excavation of seasonal wetlands within the Plant expansion area and buffer lands would impact existing Burrowing Owl habitat, necessitating habitat mitigation which could likely be accommodated on-site. For example, excavated soils from wetland construction could be used to create upland mounds adjacent to the wetlands where artificial owl burrows could be installed.
2. As noted above, the created wetlands could attract adherents who may become resistant to their future elimination.

BIOSOLIDS ODOR REDUCTION OPPORTUNITIES

Overview and Benefits

The wastewater treatment process includes a series of facultative biosolids storage lagoons and drying beds located in the northeast corner of the Plant lands that are used to process biosolids after they are stabilized using anaerobic digestion in the treatment plant. The lagoons are used to store biosolids during the rainy season when use of the drying beds is infeasible. An aerobic water cap is maintained over the biosolids to contain odors.

When the rainy season ends, the biosolids are dredged from the lagoons and pumped into the drying beds. The biosolids remain in the drying beds for about 2 months (depending on weather conditions) until they are sufficiently dried. The material in the drying beds is tilled periodically to speed the drying process. Once dried, the material is hauled to the Newby Island Landfill for use as alternative daily cover in accordance with Title 27 of the California Code of Regulations.

The lagoons and drying beds provide very cost effective treatment of biosolids. Therefore, it is assumed that this drying process will remain for the foreseeable future. However, the existing biosolids lagoons and drying beds are a source of odors that can be detected offsite, especially in the McCarthy Ranch business park and shopping areas located directly east of the Plant in Milpitas. These impacts could be mitigated by a variety of methods including the following:

1. Modifying operations of the drying facilities
2. Improving the stability of the biosolids before they are sent to the lagoons and drying beds
3. Relocating the lagoons and drying beds
4. Improving dispersion of odors by constructing a odor deflection wall

Regarding the first option, Plant staff has made various operational changes over the past two years that have resulted in reduced odor emissions. For example, an anemometer was installed to measure wind speed and direction. These data are used to limit dredging tilling, and hauling operations to periods when wind conditions are within certain limits. The second option relates to treatment processes within the main treatment plant, so it would not have a significant impact on land-use plans. The second and third options would affect land-use options, so these are discussed in more detail below.

Relocate/Expand Biosolids Lagoons and Drying Beds

The biosolids storage lagoons and drying beds may be relocated to reduce potential offsite impacts from odors. The net result of this scenario would move the current biosolids drying beds substantially farther from both Milpitas and the Rincon residential properties, and no closer to Alviso than the existing condition. By locating the facilities away from the edge of the Plant lands, odorous emissions will have more time to disperse before reaching offsite receptors. Greater dispersion would make the odors less detectable and, therefore, less objectionable. However, a cost-benefit analysis would help clarify the degree to which a relocation of the biosolids drying beds would reduce odor impacts relative to the cost of relocating them.

The lagoons and drying beds could be relocated to the Old Biosolids Lagoon area and/or to a new site within Pond A18. Relocation to Pond A18 would require partitioning of the pond using levees. All or a portion of the drying beds could be relocated without relocating the lagoons, but they should remain adjacent to each other. In addition, Pond A18 and the old biosolids lagoons could be utilized for the expansion of lagoons and drying beds, if additional space were needed for future sludge management.

The land space required for new lagoons and drying beds would be identical to the existing facilities unless the target level of drying is increased or reduced. If co-composting is implemented as described below, the biosolids would only need to be dried to about 30 to 40% total solids. Currently, biosolids are dried to a higher level (>70% total solids) to reduce hauling costs. Reducing the level of drying would reduce the land space required for drying beds and potentially reduce the associated odors. An analysis of historical drying data can be evaluated to determine the space requirements based on the target level of dryness.

Construct Odor Deflection Wall

Dispersion of odors may be enhanced by constructing a deflection wall along the eastern edge of the lagoons and drying beds. The wall could be constructed of masonry to height of about 6 feet. A dense hedgerow of trees or dense riparian tree plantings might be substituted for a masonry wall to improve visual aesthetics; however, this option would require further evaluation. The optimal height and location of the wall could be determined by measuring odor emissions and use of a dispersion model. This approach (with a masonry wall) has been used successfully to control offsite odor impacts by the Sacramento Regional County Sanitation District at its wastewater treatment plant in Elk Grove, CA.

Deflection walls divert ground-level wind upward to promote mixing of the odorous, dusty airflow with the wind passing above. As a result, the plumes of odorous air originating from the facility are made larger, higher, and more dispersed. Thus, it is reasonable to expect that in some wind conditions the aerial concentration of odorous vapors, dust, and other air pollutants in the breathing space of downwind neighbors will be reduced by improvement in air mixing. If modeling and further analysis of odor sources indicates that a deflection wall would be effective, it may be possible to leave the lagoons and drying beds in their current locations.

Relationship to Land-Use Planning Goals

Relocation of biosolids processing and/or installation of an odor deflection wall would help meet the following planning goals:

Flexibility for Plant Uses. Goals Rating (0). Reserving the old biosolids lagoons and portions of Pond A18 for future biosolids processing would ensure adequate space for expanding these facilities, if necessary.

Regulatory Compliance. Goals Rating (+). Relocating the biosolids lagoons and drying beds would not significantly affect regulatory compliance related to biosolids management or the Plant's discharge permit. However, it may improve compliance with regulations regarding nuisance odors that come under the jurisdiction of the BAAQMD. In addition, relocating the biosolids drying beds would make the land adjacent to Coyote Creek available for other uses which could help with regulatory compliance (e.g. riparian/wetland mitigation, constructed wetland treatment system)

Worker and Community Safety. Goals Rating (0). The odor reduction opportunities are neutral with respect to this goal.

Habitat Protection and Restoration. **Goals Rating (-).** Installation of an odor deflection wall could impact sensitive habitats within the Coyote Creek corridor, depending on the required location of the wall to deflect odors. Drying bed relocation would have a neutral effect on this goal since impacts to Pond A18 could be offset by restoration of a broad tidal wetland-riparian transition zone.

Good Neighbor and Public Value. Goals Rating (+). By moving the drying beds and lagoons, the buffer space between the biosolids processing facility and the community would increase, which would reduce the likelihood of offsite impacts from odors.

Economic Opportunities. Goals Rating (0). Minimizing offsite odors may improve air quality in the Milpitas area. While the Plant may not realize economic benefits, benefits may be realized in the neighboring community. This opportunity could also increase the market value of the McCarthy Strip currently owned by the City.

Capital Cost

Odor Deflecion Wall- Moderate ($1 million - $10 million)

Relocation of Biosolids Lagoons and Drying Beds – High ($10 million - $100 million)

Constraints

Constraints to relocating the drying beds are as follows:

1. Dewatering and development of a significant portion of Pond A18 would be required to accommodate biosolids lagoons and drying beds;
2. Measures to protect groundwater, including permeation barriers, may be required;
3. Measures to control flooding in the relocated lagoons/drying beds within Pond A18 may be required;
4. Reuse of the old biosolid lagoon area would require removal of the old material and may require some level of contaminant remediation, and;
5. Fill within USACE jurisdiction in Pond A18 would require mitigation.
6. Potential impacts of the odor deflection wall on regulated habitats along Coyote Creek, including the SCVWD mitigation areas. This would depend on the optimal location for the wall, which would be determined in part, via modeling.

These constraints are further described below.

Hydrology and Geomorphology. Biosolid lagoons and drying beds would require control of surface water and groundwater seepage and flood protection. It would be necessary to provide lagoons and drying beds with an impermeable lining to prevent hydrologic connection between biosolids and surrounding surface water and groundwater. If conventional, paved drying beds are constructed, they would be protective of surface water and groundwater. The old biosolid lagoons may need to be improved, for example by paving the bed and repairing the surrounding levees.

The old and existing biosolid lagoons and drying beds are mapped within the FEMA 100-year coastal floodplain. The 1988 USACE Shoreline Study, however, shows that the inboard Pond A18 levee is expected to protect the biosolid lagoons and drying beds against the 100-year flood event, and that the levees around the existing biosolid lagoons and drying beds are expected to protect against the 500-year coastal flood event. Levees similar to the inboard Pond A18 levee and biosolids lagoon and drying bed levees would need to be constructed around biosolid drying

beds in Pond A18. Alternatively, fill could be placed to raise the drying beds in Pond A18 to elevations above the flood level.

Sediment and Water Quality. It is anticipated that the reuse of the old biosolids lagoons may require some level of remediation. However, sediment and water quality in Pond A18 are not expected to pose significant constraints to relocation of the biosolids processing facilities. If necessary, clean fill and paving would be applied to the ground surface to cap any contamination. It would be necessary to investigate structural properties of the underlying soils to determine what measures may be required to construct a stable foundation.

Biology. Relocation of biosolids lagoons and drying beds to Pond A18 would entail fill of jurisdictional habitat. The USACE, BCDC, and RWQCB would require compensatory mitigation to implement alternatives that would place fill within the pond. These agencies, within the San Francisco Bay Area, typically require mitigation at a 2:1 ratio (mitigation area: impact area) via habitat creation or restoration to compensate for the functions and values impacted.

Relocation of biosolids lagoons and drying beds to the old biosolids lagoon area would require permits from the USACE, BCDC, and RWQCB as portions of this area are likely within their jurisdiction. A Section 7 Consultation with the USFWS may be required to impact marginal salt marsh harvest mouse habitat within the old biosolids lagoon area.

RIPARIAN CORRIDOR WIDENING ALONG COYOTE CREEK

Overview and Benefits

Riparian Floodplain Restoration. Relocation of the biosolids drying beds away from Coyote Creek riparian corridor on Plant lands is currently constrained by the SCVWD flood control levee and biosolids drying beds as well as regular vegetation removal to maintain channel capacity. The riparian corridor could be widened along the entire reach where riparian vegetation currently occurs and biosolids drying beds are located, from the southeast corner of Plant lands downstream to the SCVWD waterbird mitigation pond. This opportunity would entail relocating the existing flood control levee along this reach to a location further west where biosolids drying beds are currently located. The drying-bed area would be restored to the appropriate topography and soils to support floodplain riparian habitat. The levees around the biosolids processing area would be breached and/or removed. Lower floodplain terraces closer to the creek would be dominated by willows (*Salix laevigata, Salix lasiolepis, Salix exigua*), Fremont cottonwood (*Populus fremontii*), while upper floodplain terraces further from the channel would comprise riparian habitat dominated by valley oak (*Quercus lobata*) and California sycamore (*Platanus racemosa*). Active planting and short-term maintenance of the plantings would help ensure rapid establishment of the target habitat.

Willow Sausal Creation. Alternatively, willow sausals (dense thickets dominated by willows with some Fremont cottonwood) could be created within the existing drying bed area as a means of providing both habitat and wastewater effluent discharge. Willow sausals were an important habitat that occurred historically in patches around the South Bay that has been removed by

development and flood control projects (San Francisco Estuary Institute 1999; Collins and Grossinger 2004). Willows and Fremont cottonwood are known to exhibit high evapotranspiration rates and could be utilized as a means of wastewater effluent discharge. A portion of the current effluent discharged to the South Bay could be diverted to flood irrigate created willow sausals. This option could be implemented without relocation of the SCVWD flood control levee as the wastewater effluent would be the primary water source along with groundwater to support the willow habitat. This habitat would not truly be riparian, as it would be widely separated from the creekside. Nonetheless, it would serve many of the same habitat functions.

Relationship to Land-Use Planning Goals

Widening of the Coyote Creek Riparian Corridor would provide several benefits that further meet the City's land-use planning goals as follows.

Flexibility for Plant Land Uses. Goals Rating (-). The restored riparian habitat, if it were set-up as a mitigation bank, would be protected in perpetuity, thus eliminating flexibility for future Plant uses.

Regulatory Compliance. Goals Rating (+). The use of wastewater effluent to create willow sausal habitat would provide an additional means of reducing effluent discharge to the South Bay.

Worker and Community Safety. **Goals Rating (+).** Widening the Lower Coyote Creek floodplain could provide increased flood capacity, potentially improving flood protection beyond the 100-year flood protection provided by the Lower Coyote Creek Flood Control Project. In addition, the current Coyote Creek Flood Control Channel requires annual maintenance to remove woody vegetation within the channel to accommodate flood conveyance. Increasing the channel capacity by widening the floodplain could decrease the effort needed to maintain the current flood control channel.

Habitat Protection and Restoration. Goals Rating (+). Riparian habitats in California are arguably the most critical habitats for wildlife, supporting a great diversity and abundance of wildlife species including rare migratory songbirds. More than 95% of riparian habitat has disappeared in California during the last century, as a result of development and land use changes. Thus, widening of the riparian forest along lower Coyote Creek would restore valuable habitat for a variety of wildlife species including numerous rare neotropical migratory bird species.

Good Neighbor and Public Values. **Goals Rating (+).** Restored riparian habitat in this area would provide additional buffer and screening of the biosolids lagoons and drying beds from Milpitas. The additional trees could potentially further deflect and disperse odors. In addition, riparian habitat restoration would be favorably viewed by regulatory agencies and would likely be favorably viewed by the general public as well. Public trails or guided tours could be integrated into the riparian corridor widening design.

Economic Opportunities. **Goals Rating (+).** In addition, opportunity for riparian-habitat restoration is limited in the urban land-use area of San José and a portion of future City projects will likely require riparian mitigation. Project's that do not have appropriate lands on-site for riparian mitigation can require the costly purchase of lands off-site for mitigation. If not needed to offset riparian impacts on Plant lands, the widened riparian corridor could be set-up with the resource agencies as a mitigation bank and mitigation credits could be applied to future City projects or sold to other parties.

Capital Cost

The capital cost for this opportunity is rated as Moderate ($1 million - $10 million). Floodplain riparian restoration would involve breaching or removing the current flood control levee. Therefore, this estimate includes the replacement cost of the flood control levee. However, the creation of willow sausals would not require levee replacement or breaching, since this option involves flood irrigating this habitat with wastewater effluent as opposed to reconnecting restored habitat with floodplain processes.

Constraints

Hydrology and Geomorphology. Biosolid drying bed infrastructure would be removed and/or abandoned to restore hydrologic connections. The elevation of the drying beds appears to be lower than the existing adjacent Coyote Creek floodplain (Figure 5). Grading would likely be necessary to restore habitats and provide drainage and would depend on the target habitat. The existing elevation of the drying beds may be suitable for freshwater wetlands. For riparian forest habitat, fill placement may be necessary to raise portions of the drying bed to appropriate elevations (i.e., the 2-5-year floodplain elevation).

Further assessment and modeling would be necessary during design development to quantify benefits to flood protection. Groundwater interactions with restored habitats should also be considered further in design development to determine the type of riparian plant associations that could be restored.

Substrate Suitability for Habitat Restoration. Biosolids drying bed infrastructure would need to be removed to restore suitable substrate for riparian plant establishment. The 100% biosolids in the drying beds may need to be removed and in-situ historic floodplain soils, or suitable imported soils, utilized to create a suitable topsoil substrate for riparian habitat establishment. A soils investigation would be required during the conceptual design.

Permitting. Permits would be required from the USACE, BCDC, RWQCB, CDFG, and SCVWD.

RESTORATION OF RIPARIAN TO TIDAL-HABITAT-TRANSITION ZONE ALONG LOWER COYOTE CREEK-COYOTE SLOUGH

Overview and Benefits

The main stem of Lower Coyote Creek currently flows around the north side of Newby Island, with flood flows bypassing through the SCVWD Mitigation Area and into Coyote Slough

(Coyote Creek Flood Control Bypass Channel) (Figure 8). The majority of the SCVWD Mitigation Area consists of a managed salt marsh providing habitat for the salt marsh harvest mouse, with a smaller ponded area providing habitat for waterbirds. The landscape position of this site would naturally support tidal brackish and freshwater marsh with a fringe of saline grassland. Thus, the mitigation area requires perpetual, careful hydroperiod management to create soil conditions suitable for salt marsh vegetation (i.e., pickleweed) by manually opening/closing tide gates and monitoring soil and vegetation response. Even with this management effort, the site has only provided marginal habitat for very low numbers of salt marsh harvest mice. The waterbird pond, however, has provided heavily utilized habitat when managed properly.

The opportunity exists to combine the riparian-corridor widening option summarized above with tidal marsh habitat restoration in Pond A18. Tidal marsh habitat restoration in Pond A18 is described in a companion report (H. T. Harvey & Associates and others 2006b). Combining these opportunities would restore a broad, natural transition zone along the salinity/tidal gradient from non-tidal riparian habitat (freshwater) to tidal freshwater marsh and finally to tidal-brackish marsh. The restoration of a large riparian corridor connected with tidal-marsh habitat, would restore historic drainage areas along Lower Coyote Creek, provide a valuable ecotone transition area between fresh and saltwater habitats, and establish habitat connectivity along the length of Coyote Creek to the Bay. A naturally self-sustaining ecosystem would be restored in place of the existing, costly managed system. Such transition zones existed historically along the major watercourses entering the South Bay and have all been eliminated by flood control improvements and development in the former floodplains. This is one of the only opportunities in the South Bay for such a restoration.

Figure 11 provides a schematic plan view of this opportunity along with an example of how other opportunities might be combined to begin to create preliminary land-use alternatives. This drawing is not meant to constitute a land-use alternative (alternatives development will be done in a future phase) and is included to more clearly convey this opportunity to the reader. Similar to the creek widening opportunity above, the existing SCVWD Coyote Creek flood-control levee would be relocated to the west, concomitant with the relocation of biosolids drying beds. Moreover, with this opportunity, the creek flood-control levee would join with the future shoreline levee along the southern perimeter of Pond A18 to provide both riverine and coastal flood protection. The levees around the biosolids processing area and SCVWD mitigation area would be breached and/or removed.

Relationship to Land Use Planning Goals

Restoration of the riparian-tidal habitat-transition zone would support the City's land-use planning goals as follows.

Flexibility for Plant Uses. Goals Rating (+). This opportunity could provide the flexibility in the current regulatory environment for the Plant to relocate a portion of the drying beds into Pond A18 and thereby potentially reduce odors to off-site receptors. As shown in Figure 11, this opportunity would dovetail with the relocation of drying beds into the southern portion of Pond A18. The restoration of tidal-marsh habitat within the biosolids lagoon area could potentially be designed to offset impacts from the relocation of drying beds into USACE, BCDC, RWQCB

jurisdictional area within Pond A18. In addition, the reduction of odors in the southeast corner of Plant lands could increase the flexibility in this area for other uses.

Regulatory Compliance. Goals Rating (+). As noted above, if it was not needed to offset riparian impacts on Plant lands, the widened riparian corridor could be set-up with the resource agencies as a mitigation bank and mitigation credits could be applied to future City projects. Similarly, if surplus benefits were generated beyond that needed to offset Plant impacts, restored tidal marsh within A18 and the biosolids lagoon area could be banked to mitigate impacts due to future City projects.

Projected increases in the population and land use within the Plant customer area will substantially increase wastewater inflow and outflow. The customer base is linked to economic benefits for the City of San José. Yet, wastewater outflow is restricted to levels that protect tidal salt marsh habitat. Substantial increases in tidal salt-marsh habitat through the restoration of Pond A18, combined with the restoration of the connecting portion of Coyote Creek, could be explored as a potential option to protect and restore South Bay salt marshes while allowing increased effluent discharge.

Restoration of tidal marsh within Pond A18 would likely move the salinity gradient in the far South Bay and Coyote Creek further upstream, converting existing tidal brackish marsh to tidal salt marsh along Coyote Creek and Coyote Slough. Portions of Pond A18 would likely support a mix of freshwater and brackish marsh due to the effects of Plant effluent in Artesian Slough. Other portions of Pond A18 may support tidal salt marsh after breaching, particularly along the restored tidal marsh-upland transition zone described above. Modeling could be conducted to estimate the gain in tidal salt marsh within the South Bay that could be accomplished through restoring Pond A18 to tidal marsh under different effluent discharge flow rates.

Worker and Community Safety. **Goals Rating (+).** Additional flood protection could be provided by widening Lower Coyote Creek, combined with high flows emptying into restored tidal marsh.

Habitat Protection and Restoration. Goals Rating (++). As noted above, widening of the riparian forest along lower Coyote Creek would restore valuable habitat for a variety of wildlife species including numerous neotropical migratory bird species. In addition, Central California Coast steelhead (*Oncorhynchus mykiss*) and Chinook salmon (*Oncorhynchus tshawytscha*) are present in tidal habitats of the South Bay. Juvenile salmonid migration in Coyote Creek has been documented by the SCVWD (H. T. Harvey & Associates and others 2005). Increased tidal freshwater marsh may provide increased rearing and refuge habitat for salmonid fry. In addition, improved tidal-marsh and riparian habitat along juvenile salmonid migration corridors might improve smolt survival by providing refuge from predation.

Good Neighbor and Public Value. **Goals Rating (+).** Restored riparian habitat in this area would provide additional buffer and screening of the biosolids lagoons and drying beds from Milpitas. The additional trees could potentially further deflect and disperse odors. Moreover, restoration of the Lower Coyote Creek riparian corridor and connection to functioning salt marsh in the vicinity of the SBSP Restoration Project would augment current efforts for large-scale,

tidal salt-marsh restoration within the Bay, and would be favorably received by the resource agencies and the public.

Economic Opportunities. Goals Rating (0). Similar to the riparian corridor widening option, restoration of the riparian-tidal wetland transition zone could provide a mitigation banking opportunity, if a surplus of riparian and tidal wetland habitat was generated beyond that needed for Plant projects. However, the market for tidal wetland mitigation credits will likely be reduced in the Bay Area due to the mitigation that would be available through the SBSP Restoration Project. There may also be an opportunity for cost sharing with the SCVWD because this opportunity would restore a self-sustaining ecosystem through the SCVWD waterbird pond and salt marsh harvest mouse mitigation areas. These areas currently require long-term management by the SCVWD in perpetuity.

Capital Cost

The capital cost for this opportunity is rated as Moderate ($1 million - $10 million). If this opportunity were implemented, the current flood control levee would likely need to be breached or removed. This estimate includes the replacement cost of the flood control levee and also includes the assumption that fill may be required to raise the floodplain

Constraints

Flexibility for Plant Uses. The restored riparian and tidal-marsh habitat, particularly if it were set-up as a mitigation bank, would be protected in perpetuity, thus eliminating flexibility for future Plant uses.

Biology and Permitting. Permits would be required from the USACE, USFWS, BCDC, RWQCB, CDFG, and SCVWD. While small numbers of salt marsh harvest mice have been trapped in the SCVWD mitigation area (H. T. Harvey & Associates 1999), management for soil salinity and soil moisture has been a major challenge at the site and has limited the spread of salt marsh harvest mouse habitat (H. T. Harvey & Associates 2002). Mitigation would likely be required for impacting the SCVWD mitigation area; however, the restored habitat would likely create more than sufficient habitat to offset the impacts. The design should also consider and avoid or mitigate for potential alterations to habitats in the reach of Coyote Creek downstream of the restored riparian-tidal marsh zone in Coyote Slough (i.e. via dewatering of Coyote Creek downstream, if the low flow channel avulsed into Coyote Slough).

The restoration of tidal brackish water habitat in a portion of the transition zone would create conditions suitable for invasion by perennial pepperweed (*Lepidium latifolium*), a non-native species from Eurasia. This species could be controlled (via manual removal or herbicide treatment) during the initial plant establishment period to encourage the establishment of native-dominated tidal brackish marsh habitat.

Hydrology and Geomorphology. Further assessment and modeling, such as hydraulic modeling and sediment transport assessments, would be necessary to quantify the benefits to flood protection and assess feasibility. Restoring a natural riparian-tidal marsh transition zone in Coyote Slough could potentially create a more hydraulically efficient path for Coyote Creek.

For example, there may be the potential for Coyote Creek to avulse into Coyote Slough, creating a new low-flow channel. It would be necessary to consider this dynamic and avoid potential impacts to the habitats along the existing Coyote Creek low-flow channel alignment to the north of Newby Island.

Under this opportunity, an upstream shift in the salinity gradient may increase the potential for salt-water intrusion into active ground-water wells in the area.

Substrate Suitability for Habitat Restoration. The biosolids drying bed infrastructure (*i.e.*, concrete lining) would be removed to restore suitable substrate for riparian plant establishment. The 100% biosolids in the drying beds may not be a suitable substrate for the establishment of floodplain riparian habitat due to high nutrient concentrations that would facilitate weed invasion. The biosolids may necessitate removal and in-situ historic floodplain soils, or suitable imported soils utilized, to create a suitable topsoil substrate for riparian habitat establishment. A soils investigation would be required during the conceptual design.

FLOOD PROTECTION IMPROVEMENTS-SOUTH SAN FRANCISCO BAY SHORELINE STUDY

Overview and Benefits

The USACE and non-federal partners (State Coastal Conservancy and SCVWD) are beginning a Feasibility Study for an updated South San Francisco Bay Shoreline Study (2006 Shoreline Study) that includes Plant lands and Pond A18. The goals of the 2006 Shoreline Study are flood damage reduction and ecosystem restoration along the South San Francisco Bay shoreline. The Feasibility Study is in the first stage and will define project conditions and provide an initial screening of alternatives.

The opportunity exists for the City to partner and cost-share with the USACE in planning, design, and implementation of flood protection and habitat restoration. Ultimately, the USACE could provide funding for actions on Plant lands and Pond A18 that meet flood protection and habitat restoration objectives. The USACE could potentially assist with funding some of the opportunities identified above, such as the construction of a flood-protection levee and restoration of riparian habitat to the tidal-habitat-transition zone and tidal-habitat restoration in Pond A18.

Relationship to Land Use Planning Goals. Flood protection improvements and habitat restoration as part of the South San Francisco Bay Shoreline Study would support the City's land-use planning goals as follows.

Flexibility for Plant Land Uses. Goals Rating (+). Flood protection improvements could protect portions of Plant lands that are currently in the 100-year coastal floodplain. These portions of Plant lands may then be suitable for a greater range of potential land uses.

Regulatory Compliance. Goals Rating (+). Since improved flood protection would improve Plant operations during a large-scale flood event (100+ year event), it would improve the ability of the Plant to comply with its discharge permit during such an event.

Worker and Community Safety. Goals Rating (+). Improving flood protection for Plant lands would enhance worker and community safety by reducing flood hazards

Habitat Protection and Restoration. Goals Rating (-). Levee relocation would impact jurisdictional wetlands and open water. Nonetheless, improved flood-protection and levee relocation is integral to a number of habitat restoration opportunities (tidal marsh restoration in Pond A18, restoration of tidal habitat transition zones, riparian corridor widening along Coyote Creek).

Good Neighbor and Public Value. Goals Rating (+). Flood protection improvements for Plant lands may also improve flood protection for neighboring areas. Habitat restoration would likely be viewed positively by the regulatory agencies and the public.

Economic Opportunities. Goals Rating (+). Flood protection improvements could potentially reduce the likely costs of flood damages, eliminate the need for federal flood insurance, and make flood-prone portions of Plant lands suitable for economically beneficial land uses.

Capital Cost

The capital cost of flood control improvements related to the South San Francisco Bay Shoreline Study are unknown at this time. However, the potential exists for Federal, State, and Local cost sharing for this project. It is uncertain at this time on how the Federal-Local cost share would work (i.e., whether the City or SCVWD would be responsible for a local match). The emphasis on this potential cost share is to indicate a benefit from the Federal cost share, rather than emphasizing the local match (undefined).

Constraints

The USACE cost share applies only to project elements for which the USACE determines there is a federal interest. It is not known at this time whether there will be a federal interest in any actions on Plant lands because the 2006 Shoreline Study is still in the first stage of the planning process. A federal interest applies if the benefit:cost ratio is greater than one, using specified USACE analytical procedures. The benefits take into account the quantitative economic savings of flood damage reduction and qualitative benefits of ecosystem restoration.

The 2006 Shoreline Study is essentially a USACE and federal-government-driven process. The schedule, rates and extent of USACE funding, and planning methods for the 2006 Shoreline Study, depend on factors inherently outside of the City's control. The Feasibility Study is currently predicted to extend through the end of 2009. This study would then be followed by Preliminary Engineering Design, Final Design, and construction. The actual schedule will depend on the timing for USACE approvals and levels of USACE funding. USACE funding must be approved and allocated by the federal government. Planning methods are specified by standard USACE procedures.

CO-COMPOSTING FACILITY

Overview and Benefits

The Plant presently utilizes approximately 532 acres of land for active biosolids lagoons and drying beds. The process includes storing sludge produced by the Plant in a series of shallow lagoons that allow the water to evaporate. It is a relatively low-tech approach that has worked well for several decades. The tributary agencies were fortunate to have land available at what was a relatively isolated location for many years, allowing low-cost management of biosolids for so long. As development has increased in the northeastern quadrant of the Santa Clara Valley, the encroachment of urbanization downwind of the lagoons and drying beds has introduced the likelihood of odor disturbance from the Plant and the Plant's neighbors, which include a regional landfill, composting facilities, and the mudflats of the South Bay.

As the Plant evaluates possibilities associated with its recent purchase of Pond A18, the ongoing South Bay Salt Pond Restoration study, and the future Plant expansion, an opportunity to reduce the land dedicated to active biosolids management is available. Similar to a recently permitted facility currently under construction by the Los Angeles County Sanitation Districts in Kings County, a co-composting facility that creates compost from biosolids and wood waste/green waste could be established on Plant lands. The purpose of the facility would be to produce a soil amendment that could be used on agricultural lands or marketed for other horticultural purposes. The City of San José alone produces approximately 179,000 tons per year of urban green waste that is collected weekly from primarily single-family homes, and which the City pays to have collected and processed into compost or sold for biomass. There is substantial additional green waste that is produced by commercial properties and multi-family residential developments. In Santa Clara County, green waste is produced throughout the year in significant quantities.

Co-composting involves controlled, aerobic, decomposition of biosolids mixed with other organic waste materials (e.g., green waste) to produce a commercially valuable product that can be used as soil amendment or mulch. Composting results in an additional 20 to 30% reduction in the volatile solids content of anaerobically digested biosolids. Thus, the finished product is highly stable and odor free. The product can be relatively coarse, which makes it suitable for use as mulch. Coarse particles can be removed if desired using screens to produce fine material that can be used as soil amendment.

The most opportune location for a co-composting facility would appear to be the old biosolids lagoons, where the active processing would not be visible from Highway 237 or from the new developments in Milpitas. There may also be alternative locations within the current biosolids lagoons and drying beds for a co-composting facility, depending on how the Plant might choose to reformat the biosolids lagoons and biosolids drying beds to fit with a co-composting process.

Based on preliminary calculations by CH2MHILL, an Aerated Static Pile composting facility would require about 20 acres of land assuming that if was designed to process 43,000 dry tons per year of biosolids with a starting solids concentration of 30% total solids. This estimate is based on a previous analysis prepared for the Bay Area Clean Water Agencies, which estimated that the Plant currently produces about 43,000 dry tons per year of biosolids (CH2MHILL 2004).

If the drying beds were operated to produce material that was 30% total solids for input to a co-co-composting facility, (compared to current operations that produce material with 70 to 80% total solids), the drying bed area could potentially be reduced by about 50%. However, the total required area is site specific and depends on design/operation of the drying beds, temperature, rainfall, wind, and humidity. Therefore, additional analyses would be required to better estimate the reduction in drying bed area that could be achieved. The size of the lagoons would remain unchanged since they are a function of seasonal weather only; the lagoons are independent of the dryness of the biosolids. If the drying bed area were reduced by 50%, from 265 acres to approximately 133 acres, the old biosolids lagoons area (~214 acres) would easily accommodate both an Aerated State Pile composting facility and relocated drying beds.

Co-composting Market. Suitable markets currently exist for compost materials. Based on a survey conducted by the California Integrated Waste Management Board (CIWMB 2001), the current statewide market for compost materials is dominated by the agricultural market (47 percent) and horticultural markets (37 percent). Other markets include municipal uses (5 percent), landfill cover (5 percent), biomass-to-energy (2 percent), Caltrans (2 percent) and direct sales to local residents and in-house uses (both at 1 percent).

Relationship to Land Use Planning Goals

Co-composting could help meet the following land-use planning goals:

Flexibility for Plant Uses. Goals Rating (+). Co-composting may be beneficial compared to existing biosolids management practices because it produces a commercially valuable product that could be sold as a soil amendment or for erosion control. Currently, all biosolids are dried and hauled to the Newby Island Landfill for use as alternative daily cover. The landfill appears to be a good alternative for at least the next ten years, but changes in regulations or closure of the landfill would require implementation of alternative biosolids management practices. According to the CIWMB, the landfill is scheduled to close at the end of the year 2020 unless new landfill cells are developed. Because Newby Island is the only current outlet for biosolids, the City has limited control of the cost charged to send material to the landfill. Taking advantage of other outlets for biosolids would increase diversity, making the biosolids management program more sustainable.

By transforming two waste products into a useful commodity, future limitations on the Plant associated with the generation, storage, and/or disposal of biosolids are substantially reduced. The potential to reduce the drying bed area, as noted above, would provide additional flexibility for existing land uses in that area.

Regulatory Compliance. Goals Rating (+). As the compost process proceeds to completion during the hotter months, some additional water may be required to maintain moisture in the composting windrows. Storing finished compost for curing or marketing purposes may also require use of recycled water for dust control. Therefore, this opportunity could increase the use of recycled water on-site.

Worker and Community Safety. Goals Rating (+). The transformation of biosolids and green waste into a fully composted soil amendment protects the public's health by creating a

product that is stable and: (a) can be used without restriction for a number of productive purposes; (b) is not a threat and presents no risk to the environment; and (c) when used as a soil amendment, enhances the soil and increases its productivity. The reduced presence of lagoons containing biosolids might reduce the minimal risk of persons falling into the ponds.

Habitat Protection and Restoration. Goals Rating (0). The finished compost product could be used in habitat restoration projects on Plant lands, in Pond A18 and potentially for the SBSP Restoration Project as described below.

Good Neighbor and Public Value. Goals Rating (Unknown) It is unknown at this point what the effects co-composting would have on odor protection. The co-composting facility itself could be built as an enclosed facility with the odors scrubbed. However, the effect on odor generation from biosolids harvesting for co-composting is unknown at this time. If it is done elsewhere, what have they found out? (See Air Quality Constraints section below) While the drying bed area could potentially be reduced, changing drying operations to produce material that is only 30% solids may increase odor production, because the material would be loaded into trucks while it is still relatively wet. Wet solids tend to produce more odors than dry solids. An odor study would be necessary to determine the net effect on odor production.

In addition, a useful service could be provided to the community by providing an opportunity for the recycling of public green waste, and providing a source of horticultural and agricultural amendments to the public. If the co-composting facility were located in the currently inactive biosolids lagoon area, the operation would not be visible from Highway 237 or from within the City of Milpitas.

Economic Opportunities. Goals Rating (+). Co-composting is not expected to generate enough revenue to offset costs. However, it would reduce risk associated with the potential closure of the Newby Island Landfill that is the current disposal site. Compared to other options that may be required if the landfill closes, co-composting may be economically advantageous. In addition, co-composting would allow simultaneous management of biosolids and wood/organic wastes.

Capital Cost

The capital cost for this opportunity is High ($10 million - $100 million).

Co-Composting Technologies

Three composting technologies are suitable for the large-scale facilities that would be required at the Plant. These are:

1. Aerated static pile composting
2. In-vessel composting
3. Open-air windrow composting

Each of these technologies uses identical feedstock mixing and screening processes. The differences between the technologies are found in the composting step. The composting steps for each technology are described in Appendix A.

Constraints

There do not appear to be any significant constraints to implementing co-composting. However, it would be necessary to consider the following issues:

1. increased costs compared to existing management practices.
2. control of air emissions, including odors, VOCs, ammonia, and particulate matter.
3. constraints related reuse of the old biosolids lagoon area.
4. Permits would be required from BAAQMD to build and operate a co-composting facility.
5. Depending on the location of the facility (e.g. in or adjacent to regulated habitats), USACE, RWQCB and BCDC permits may be required. A permit may also be required from the California Integrated Waste Management Board.

Increased Cost. Co-composting will increase operations and maintenance costs since it would be a new process added onto existing processes. Other processes including drying beds would still be required. In addition, the net cost to produce co-compost is greater than the market price. A study prepared for the BACWA (CH2MHILL 2004) found that a large scale composting facility designed to process about 50 dry tons per day of biosolids utilizing the aerated static pile composting method would have a net unit cost of about $55 per wet ton, assuming the feed biosolids are dewatered to 18% total solids. Finished compost can be sold for approximately $30-40/ton. In comparison to the unit cost described above, the City currently pays $13 per ton to have biosolids hauled to the Newby Island Landfill for use as alternative daily cover. The BACWA facility was estimated to cost $100 million to construct.

1. **Air Quality.** Although nuisance odors and air emissions are regulated by the BAAQMD, there are no specific regulations requiring containment and treatment of odors and other emissions from composting facilities in the Bay Area. However, odors and other emissions are likely to be a major consideration when evaluating potential environmental impacts of a composting operation. In addition, regulations requiring odor/emissions control could be enacted in the future like those already established by the South Coast Air Quality Management District (SCAQMD) in southern California. Nonetheless, containment and control of odors and air emissions can be achieved effectively when aerated static pile and in-vessel composting are used. If aerated static pile technology is used, the system can be maintained under a vacuum. Fresh air would be drawn downward through the compost piles into a plenum constructed under the piles. Air from the plenum would then be blown through biofilter beds that would remove constituents of concern. This method is practiced at facilities design by CH2MHILL for the Inland Empire Utilities Agency/LA County Sanitation Districts in Riverside County and for Synagro in Kern County. These facilities are in compliance with new/strict regulations on composting facilities enacted by the South Coast and San Joaquin Valley Air Districts. (The San Joaquin Valley rules is still a draft.) A similar method is used for the agitated bin composting process operated by the City of Santa Rosa.

As noted above, the process of harvesting wetter biosolids for co-composting would generate odors and an odor study would be needed to determine whether this effect would be substantial compared to the existing condition.

Reuse of the Old Biosolids Lagoon Area. If a co-composting facility were to be located within the old biosolids lagoon area, some level of remediation may be required. In addition, reuse of the old biosolids lagoon area may require permits from the USACE, BCDC, and RWQCB as portions of this area are likely within their jurisdiction. A Section 7 Consultation with the USFWS may be required to impact marginal salt marsh harvest mouse habitat within the old biosolids lagoon area.

REGIONAL BIOSOLIDS PROCESSING FACILITY

Overview and Benefits

A portion of the Plant lands (e.g. a portion of the old biosolids lagoon area) could potentially be used to locate a new regional facility for processing biosolids from the Plant and other wastewater utilities in the Bay Area. Currently, most wastewater utilities in the Bay Area beneficially use biosolids as soil amendment at land application sites in Solano and Merced Counties or as alternative daily cover (ADC) at various solid waste landfills. Recently, some utilities have also started sending a portion of their biosolids to a composting facility in Merced County. The long-term viability of land application and the composting facility in Merced County are at risk, however, due to potential new (and more stringent) regulations. Moreover, use of biosolids as ADC is at risk due to pending landfill closures and competition from other waste materials that can be used as ADC.

Solano County has an ordinance that allows land application of Class B biosolids at permitted sites. However, the ordinance is scheduled to sunset in 2007. Proposals to replace the existing ordinance have not been issued yet, but there is a considerable chance that a more stringent ordinance may be enacted. In light of this risk, wastewater utilities that use the land application sites are looking for alternatives.

The composting facility in Merced County is currently a viable option. However, the facility uses open-air windrow composting technology that produces odors and emits particulate matter, volatile organic compounds, and ammonia. Such emissions may be regulated in the near future under draft Rule 4565 Composting/Biosolids Facilities issued by the San Joaquin Valley Air Pollution control District. If adopted, this rule would limit the amount of material that could be processed or require conversion to aerated static pile (ASP) composting technology, which produces significantly fewer emissions. Moreover, this facility is over 100 miles from most wastewater treatment plants in the Bay Area, which makes hauling costs prohibitive.

Given the issues listed above, development of a regional biosolids processing facility on the Plant lands is a promising option. A variety of processing technologies could be implemented to process biosolids on a regional level. In general, the most promising of the technologies involve production of a marketable product, disposable of the material, or incineration. Depending on

the selected technology, 5 to 50+ acres of land would be required to implement this opportunity. Some of the available technologies are listed here:

1. Composting using ASP or in-vessel composting technology.

2. Thermal drying to produce pellets that can be used as a soil amendment.

3. Gasification using a process similar to one developed by Enertech Environmental, Inc. to produce fuel consisting of syngas and char.

4. Vitrification to produce glass aggregate using technology developed by Minergy Corporation.

5. Fertilizer production by adding nutrients to biosolids and drying the biosolids in a process similar to conventional thermal drying.

Relationship to Land-Use Planning Goals

Flexibility for Plant Uses. Goals Rating (0). Depending on the technology used, the facility could require significant land space, which would reduce flexibility of land uses available to the Plant. However, some technologies are relatively small (e.g. thermal drying) and would not have a significant impact on land-use flexibility. The benefits of hosting a regional biosolids processing facility would be strictly monetary. A regional facility could be used to offset the costs of processing and managing biosolids produced at the Plant. Impacts from odors, truck traffic, etc. would need to be considered carefully before a decision could be made about hosting a regional facility.

Regulatory Compliance. Goals Rating (0). A regional biosolids processing facility would not have significant impacts on the Plant's NPDES discharge permit. However, due to its size and the amount of air emissions already generated, the Plant is regulated as a major source under Title V of the Clean Air Act. Revisions to the Title V permit would be required if a regional biosolids facility is located at the Plant.

As the compost process proceeds to completion during the hotter months, some additional water (e.g. recycled water) may be required to maintain moisture in the composting windrows. Storing finished compost for curing or marketing purposes may also require use of recycled water for dust control. Thus, this opportunity could increase use of recycled water on-site.

Worker and Community Safety. Goals Rating (0). Development of a regional biosolids processing facility is not expected to have significant impacts to the safety of workers or the community.

Habitat Protection and Restoration. Goals Rating (0). Development of a regional biosolids processing facility is not expected to have significant benefits or impacts to habitat protection and restoration opportunities.

Good Neighbor. Goals Rating (-). A regional biosolids facility would increase truck traffic and odors. These impacts would need to be evaluated and may require mitigation.

Economic Opportunities/Public Values. Goals Rating (+). Fees charged to other utilities could potentially offset costs of processing biosolids from the Plant.

Capital Cost

The capital cost for the development of a regional biosolids facility is rated as Very High (> $100 million).

Constraints

Constraints to development of a regional biosolids processing facility include potential environmental impacts and financing. Environmental impacts would require evaluation and, potentially, mitigation. A financial feasibility assessment should be conducted prior to moving forward with development.

BIOSOLIDS MONOFILL

Overview and Benefits

A portion of Plant Lands could be used to develop a biosolids monofill, similar to the facility used by Sacramento Regional County sanitation District. The monofill could be used exclusively by the Plant, or it could accept biosolids from other wastewater utilities in the Bay Area.

Relationship to Land-Use Planning Goals

Flexibility for Plant Uses. Goals Rating (0). Development of a biosolids monofill would reduce flexibility for using plant lands because the monofill would cover a large amount of land that could not be used for other purposes. However, it could potentially be located in the existing drying bed area since drying beds would not be used under this scenario. Additionally, it is anticipated that Newby Island will close in approximately 14 years and at that time the Plant will need to find an alternative option for disposal of biosolids. Location of a biosolids monofill on Plant lands would provide flexibility for the Plant disposal of biosolids.

Regulatory Compliance. Goals Rating (0). Construction of a biosolids monofill is not expected to have significant impacts on regulatory compliance.

Worker and Community Safety. Goals Rating (0). Construction of a biosolids monofill is not expected to have significant impacts on worker and community safety**.**

Habitat Protection and Restoration. Goals Rating (-). Development of a biosolids monofill would reduce opportunities for habitat protection and restoration because the monofill would cover a large amount of land that could not be used for other purposes.

Good Neighbor and Public Values. Goals Rating (0). If biosolids from other plants were hauled to the site, truck traffic in the community would increase. However, a biosolids monofill should not impact visual aesthetics or odors. The biosolids monofills in Sacramento and Dublin-San Ramon have been used for decades and have not experienced any appreciable increase in elevation. The material eventually degrades, leaving only cellulosic material. Moreover, since new material applied to the field is normally injected below the surface, odors are minimal.

Economic Opportunities. Goals Rating (0). Because the Plant already owns the land that would be used, a monofill is expected to have relatively low cost compared to other biosolids management alternatives.

Capital Cost

The capital cost associated with biosolids monofill is rated as Moderate ($1 million - $10 million).

Constraints

Revisions to the Plant's Title V air permit would be required. In addition, the RWCQB may impose restrictions on this option, potentially including installation of a liner to protect underlying groundwater.

BIOSOLIDS AND/OR CO-COMPOST FOR TIDAL MARSH RESTORATION

Overview and Benefits

Dried or co-composted biosolids could potentially be used beneficially for tidal-marsh restoration in Pond A18 or in other locations associated with the SBSP Restoration Project. The SBSP Restoration Project has proposed restoration of extensive lengths of tidal marsh-upland transition zone habitat along the upland edges of restored tidal marshes. The restored tidal marsh-upland transition zone would comprise a broad (150-300 foot wide), gently sloped ecotone extending from the top of the improved inland levees (i.e., the future shoreline levee) downslope to restored tidal marsh plains (Figure 12). This restored habitat feature would provide high-tide refugia for numerous tidal-marsh animal species including the federally-listed salt marsh harvest mouse and California Clapper rail. This biologically valuable ecotonal feature previously existed around the perimeter of the San Francisco Bay, but has been almost entirely obliterated by development, salt pond construction, and flood control levees.

If dried or co-composted biosolids could be used alone, or mixed with dredged material, to build this transition zone substrate, the SBSP Restoration Project would comprise a relatively large market. Thus, this represents a cost-effective opportunity for the Plant to beneficially reuse its biosolids, given that the Newby Island Landfill is anticipated to close in the year 2020. Whereas the currently pays $13 per ton to have biosolids hauled to the Newby Island Landfill for use as alternative daily cover, there could be an opportunity to donate the material to the SBSP Restoration Project for ecotone restoration. The estimated volume of fill to construct the marsh-upland transition zone for the SBSP Restoration Project is approximately 0.8 to 4.4 million cubic yards, depending on the restoration alternative and the width of the transition zone. Assuming

the cost of obtaining/providing fill material is not a constraint for the SBSP Restoration Project, there is potential to create more marsh-upland transition areas with a larger volume of fill.

In addition, dried or co-composted biosolids or biosolids/co-compost mixed with dredged material could potentially be used as fill to accelerate the rate of tidal-marsh habitat establishment for the SBSP Restoration Project by raising the elevations of subsided salt ponds (Figure 12).

Relationship to Land Use Planning Goals

This opportunity would help meet the following land-use planning goals.

Flexibility for Plant Uses/Economic Opportunity. Goals Rating (+). As noted above in the Co-composting section, the Newby Island Landfill will eventually close (~2020) eliminating the current sole outlet for the Plant's biosolids. This opportunity should be explored because it represents a potential future market for the Plant's biosolids.

Regulatory Compliance. **Goals Rating (0).** Contaminant concentrations/bioavailability in biosolids used for tidal marsh restoration would need to be low enough to avoid impacts to aquatic organisms. RWQCB approval would be necessary for reuse of biosolids for tidal marsh restoration. This is discussed in the Constraints section below.

Worker and Community Safety. Goals Rating (0). This opportunity is not expected to have significant impacts on worker and community safety**.**

Habitat Protection and Restoration. Goals Rating (+). The successful reuse of biosolids for marsh restoration could have a positive effect on habitat restoration in the South Bay and beyond.

Good Neighbor and Public Values. Goals Rating (+). The provision of materials for the SBSP Restoration Project would help the project management team for this project and the public that supports this project.

Economic Opportunities. **Goals Rating (+).** The Plant currently pays $13 per ton to have biosolids hauled to the Newby Island Landfill for use as alternative daily cover. The SBSP Restoration Project could potentially accept biosolids as a gratuity from the City assuming that the constraints identified below were not significant.

Capital Cost

As noted above the provision of the Plant's biosolids to the SBSP Restoration Project and/or to tidal restoration in Pond A18 would result in a cost savings to the Plant compared to the current cost to the Newby Island landfill.

Constraints

Constraints to the use of biosolids in marsh restoration include:

1. RWQCB contaminant screening guidelines for dredged material reuse in wetland creation would likely need to be met.
2. Biosolids may constrain revegetation if used as cover.
3. It would be necessary to investigate the effect of biosolids on the stability of restored marsh and transition zone elevations.

Sediment and Water Quality. Biosolids used for marsh restoration may be required to comply with RWQCB contaminant screening guidelines for reuse of dredge material to help ensure the protection of aquatic life (RWQCB 2000). In addition, the USFWS is in the process of developing contaminant screening criteria for reuse of dredge material for wetland creation that may also need to be considered. Table 3 compares these RWQCB criteria to the federal Part 503 Rule that regulates biosolids used for land application. As described in the RWQCB's guidelines, dredge material can be used as either foundation material (not exposed to the environment) or surface material (exposed to the environment). If biosolids were used for marsh/wetlands restoration, they would primarily be be used as wetland foundation material, but could potentially be used as surface material if contaminant concentrations were adequately low.

As indicated in Table 3, the RWQCB guidelines for metals concentrations in dredge material are somewhat more stringent than the requirements of the Part 503 Rule. Moreover, the RWQCB guidelines cover organochlorine pesticides, polychlorinated biphenyls, and poly aromatic hydrocarbons that are not addressed in the biosolids regulations.

Contaminant concentration data for biosolids produced at the wastewater treatment plant were not reviewed for this study. If biosolids were to be used for marsh restoration, it would probably be necessary to test the material to determine if it meets the RWQCB's guidelines. If the biosolids do not meet these guidelines, they could be blended with relatively clean soil or potentially blended with green waste and co-composted to meet the guidelines. However, blending to meet the guidelines would need to be approved by the RWQCB.

Table 3. Dredge and Biosolids Quality Requirements

Parameter	Wetland Surface Material	Wetland Foundation Material	Pollutant Concentration Limits for Exceptional Quality Biosolids (Part 503 Rule)
METALS (mg/kg)			
Arsenic	15.3	70	41
Cadmium	0.33	9.6	39
Chromium	112	370	1,200
Copper	68.1	270	1,500
Lead	43.2	218	300
Mercury	0.43	0.7	17
Nickel	112	120	420
Selenium	0.64		36
Silver	0.58	3.7	N/A
Zinc	158	410	2,800
ORGANOCHLORINE PESTICIDES/PCBS (mg/kg)			
DDTS, sum	7	46.1	N/A
Chlordanes, sum	2.3	4.8	N/A
Dieldrin	0.72	4.3	N/A
Hexachlorocyclohexane, sum	0.78		N/A
Hexachlorobenzene	0.485		N/A
PCBs, sum	22.7	180	N/A
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)			
PAHs, total	3,390	44,792	N/A
Low molecular weight PAHs, sum	434	3,160	N/A
High molecular weight PAHs, sum	3,060	9,600	N/A
1-Methylnaphthalene	12.1		N/A
1-Methylphenanthrene	31.7		N/A
2,3,5-Trimethylnaphthalene	9.8		N/A
2,6-Dimethylnaphthalene	12.1		N/A
2-Methylnaphthalene	19.4	670	N/A

Parameter	Wetland Surface Material	Wetland Foundation Material	Pollutant Concentration Limits for Exceptional Quality Biosolids (Part 503 Rule)
2-Methylphenanthrene			N/A
3-Methylphenanthrene			N/A
Acenaphthene	26	500	N/A
Acenaphthylene	88	640	N/A
Anthracene	88	1,100	N/A
Benz(a)anthracene	412	1,600	N/A
Benzo(a)pyrene	371	1,600	N/A
Benzo(e)pyrene	294		N/A
Benzo(b)fluoranthene	371		N/A
Benzo(g,h,i)perylene	310		N/A
Benzo(k)fluoranthene	258		N/A
Biphenyl	12.9		N/A
Chrysene	289	2,800	N/A
Dibenz(a,h)anthracene	32.7	260	N/A
Fluoranthene	514	5,100	N/A
Fluorene	25.3	540	N/A
Indeno(1,2,3-c,d)pyrene	382		N/A
Naphthalene	55.8	2,100	N/A
Perylene	145		N/A
Phenanthrene	237	1,500	N/A
Pyrene	665	2,600	N/A

Revegetation Constraints. Biosolids would be used primarily as foundation material. However, if biosolids were considered for use as wetland surface material the following revegetation constraints would apply. The distribution of tidal-marsh-plant species and associated invasive species is driven to a large extent by hydroperiod (Mitsch and Gosselink 2000; H. T. Harvey & Associates and Philip Williams & Associates 2002). However, other factors related to substrate type also control plant species distributions in tidal marshes and within the tidal marsh-upland transition zone. These factors include bulk density, redox potential, salinity, drainage, nutrient concentrations, and sulfide concentrations (H. T. Harvey & Associates and Philip Williams & Associates 2002.). Biosolids and co-compost, if used alone as a cover, would likely alter these factors compared to natural conditions where the marsh and

marsh-upland transition zone substrate has a substantial mineral component. This could lead to weed invasion especially in the upper portions of the tidal marsh-upland transition zone where hydroperiod exerts less control over plant species distribution. Therefore, from the perspective of revegetation, it would not be feasible to use 100% biosolids or co-compost as cover material (topsoil) to restore tidal marsh-upland transition zone habitat. In addition, we are uncertain whether it is feasible to use 100% biosolids or co-compost as cover material for restoration of the tidal marsh plain. However, higher concentrations of biosolids or co-compost could be placed below the cover soil (greater than two feet below the finish grade) and meet tidal-marsh revegetation goals. Further study, and potentially, a pilot project would help determine the appropriate use of biosolids/co-compost as surface material to meet revegetation goals.

SOLAR POWER GENERATING FACILITIES

Overview and Benefits

A solar energy production facility could be developed on Plant lands. Two technologies (photovoltaic generation and concentrating solar power) could be used to generate electricity and/or heat to offset power consumption within the Plant. In particular, a solar power plant could offset a significant portion (if not all) of the energy that would be used if a UV disinfection process were constructed. Moreover, a solar generating plant could supply heat/power to a biosolids processing facility like those described above.

The best locations for solar power generating facilities, such as the Mojave Desert, have average solar radiation rates ranging from 7 to 8 kWh/m^2/day. In San José, the average solar radiation is 5.5 to 6.0 kWh/m2/day, making it better than average compared to other areas of the United States but not as good as the best locations (source: NREL, 2004).

Photovoltaic Solar Energy

Photovoltaic (PV) technology is the most commonly used method to generate solar energy. A photovoltaic array or solar photovoltaic panel is a flat collection of solar cells used for converting solar energy into electricity (Photo 1). The application of photovoltaic arrays for medium and large-scale energy production is known as photovoltaics.

PHOTO 1
256 kW Photovoltaic Facility
Vallejo, CA

Solar photovoltaic panels contain arrays of solar cells that convert light into electricity. Solar cells, or PV cells, rely on the photovoltaic effect, which describes how certain materials can convert sunlight into electricity to absorb the energy of the sun and cause current to flow between two oppositely charged layers. Individual solar cells provide a relatively small amount of power, but electrical output is significant when connected together as an array making up a panel.

PV panels can convert about 12 to 15% of incident solar energy to electricity, or about 120 W/m^2 of panel area. Typically, about 5 to 7 acres of land are required for a 1 MW generating facility. Generation of electricity using PV technology rises and falls with the intensity of solar radiation. The energy cannot be stored easily, so the systems are typically only useable during daylight hours. Therefore, the electricity production may not coincide with electricity demand.

Net metering can be used to manage differences between production and demand patterns. Net metering is a method of crediting customers for electricity that they generate on site in excess of their own electricity consumption. Customers with their own generation offset the electricity they would have purchased from their utility. If such customers generate more than they use in a billing period, their electric meter turns backwards to indicate their net excess generation. Currently in California, net metering is limited to distributed generation facilities smaller than 1 MW.

PV systems typically cost about $8,000 per kW of capacity to install. This price can be reduced to about $4,000 per kW through government-sponsored grant and incentive programs. With the subsidies, electricity can be produced for about $0.20 per kWh, which is still higher than most other energy sources.

Concentrating Solar Power[5]

Concentrating solar power (CSP) is a process that collects solar energy as heat that can then be used to generate electricity in a steam turbine or other mechanical system. The heat could also be used for other purposes such as drying biosolids. CSP is growing in popularity due to heightened interest in renewable/domestic power supplies and relatively low costs compared to photovoltaic systems. There are nine CSP generating facilities currently operating in the Mojave Desert with combined capacity to produce 354 MW, and several more are planned or under construction throughout the southwestern United States.

PHOTO 2
Trough Collectors for Concentrating Solar Power
Source: Sandia National Lab

The National Renewable Energy Lab (NREL) has a goal to install 1,000 MW of new concentrating solar power systems in the southwestern United States by 2010. This level of deployment, combined with research and development to reduce component costs, could help reduce concentrating solar power electricity costs to $0.07 per kWh. At this cost, concentrating solar power can compete effectively in the Southwest's energy markets. According to NREL, existing facilities located in areas with high solar radiation produce power at a cost of $0.12 to $0.14 per kWh.

There are three main types of concentrating solar power systems: *parabolic-trough*, *dish/engine*, and *power tower*. Parabolic-trough systems, which can be sized with capacities from 1.0 to 100 MW, are most suitable in this case. The minimum size for a power tower system is about 30 MW, and dish/engines systems are still in development stages.

[5] Source: National Renewable Energy Lab (NREL)

Parabolic-trough systems concentrate the sun's energy through long rectangular, curved (U-shaped) mirrors (Photo 2). The mirrors are tilted toward the sun, focusing sunlight on a pipe that runs down the center of the trough. Reflected sunlight heats the oil flowing through the pipe. The hot oil then is used to boil water in a conventional steam generator to produce electricity. Solar energy conversion in CSP systems ranges from 13% to 16%, which is similar to PV. Therefore, the amount of space required for a CSP facility would be about the same as a PV facility with the same generating capacity.

With the addition of thermal energy storage, concentrating solar power technologies can provide power during periods when demand on the utilities is at its peak, even if the sun is not shining. This ability to provide power after sunset is a significant advantage of CSP compared to PV. NREL and other organizations are currently researching advancements in thermal energy storage technologies to improve performance and reduce costs.

Relationship to Land-Use Planning Goals

Flexibility for Plant Uses. Goals Rating (+). A solar generating facility would allow the Plant supply a portion of its energy needs on-site, thus allowing the Plant to operate more cost effectively.

Regulatory Compliance. Goals Rating (0). A solar generating facility is not expected to have significant affects on regulatory compliance

Worker and Community Safety. Goals Rating (0). A solar generating facility is not expected to have significant affects on worker and community safety.

Habitat Protection and Restoration. Goals Rating (-). A solar generating facility would use a significant amount of land, thereby limiting opportunities to protect and restore habitat.

Good Neighbor and Public Values. Goals Rating (0). A solar generating facility is not expected to have significant effects on the surrounding community.

Economic Opportunities. Goals Rating (+). It may be possible to generate electricity for less than the cost of electricity purchased from PG&E. If so, the Plant would realize economic benefits. A financial assessment should be conducted to determine if economic benefits could be realized.

Capital Cost

The capital cost related to the use of photovoltaic and/or concentrating solar power is rated as High ($10 million - $100 million).

Constraints

A solar generating facility would use a significant amount of land, and it would be costly to construct. However, net operating costs may be low if the amount of power purchased from PG&E is reduced.

SOIL STOCKPILING FOR CONSTRUCTION PROJECTS

Overview and Benefits

Currently, soil from City projects is stored at the Nine Par site. As such, the current operation does not generate revenue for the Plant, but reduces City costs. To generate revenue for the Plant, a portion of the Plant lands could be leased to landfill operators as a place to store excess soil from construction sites in the region. The landfill operators would charge contractors to deposit soil that could be used later as cover material in the landfill.

Relationship to Land-Use Planning Goals

Flexibility for Plant Uses. Goals Rating (0). Stockpiling of soil would restrict flexibility to use plant lands for other purposes. Conversely this opportunity would allow the Plant to operate more cost effectively by generating revenue.

Regulatory Compliance. Goals Rating (-). Soil stockpiling would require dust control measures to comply with air quality regulations. Regulatory compliance would also require that soils be free of contamination.

Worker and Community Safety. Goals Rating (-). Increased truck traffic would negatively impact worker and community safety.

Habitat Protection and Restoration. Goals Rating (-). Soil stockpiling would not contribute to the goal of habitat protection and restoration. Although, soil stockpiling could be done at locations that avoid impacts to sensitive biotic resources.

Good Neighbor. Goals Rating (-). Importing soil would increase truck traffic in the surrounding community.

Economic Opportunities/Public Values. Goals Rating (+). This alternative may generate revenue to reduce the operational costs of the Plant.

Capital Cost

Soil stockpiling would generate revenue.

Constraints

No significant restraints were identified.

PUBLIC TRAILS AND ENVIRONMENTAL EDUCATION

Public Trail Opportunities

The Plant lands represent an opportunity for the Plant to connect with the public in a new and mutually beneficial way by providing sites for a variety of public activities on available buffer land sites. The nature of the Plant lands makes them particularly valuable for trail, and environmental education activities and the Plant could consider accommodating these uses at appropriate locations. The public would gain new recreation and education opportunities and the Plant might gain a new constituency through public recognition and some new public insight into Plant purposes and programs.

The Plant lands present excellent opportunities for trails along creeks and sloughs, out toward the south end of San Francisco Bay and west toward the village of Alviso. Several Plant land alternatives for the San José segments of the San Francisco Bay Trail and other trail alignments are discussed below (Amphion Environmental 2002). While other recreation uses on Plant lands should generally be interim, trails may need to be accepted as more long term if they are links in larger trail systems and located in areas frequently not practical for other uses (e.g. along property edges, roads, creeks, on levees, etc).

That said, any new trails would have to be located and managed very carefully to maintain Plant security and flexibility and to ensure public safety. Trails are not expected to significantly affect plant flexibility since they are most apt to be located in areas remote from existing or planned Plant operations, with the possible exception of the San Francisco Bay Trail, which is currently planned to wrap around the Plant operations area. In addition, Plant security should be a factor in any land use decisions. Land use and design options should be selected to protect against potential incidents of destructive mischief or intentional damage to Plant functions. It is probable, however, that security may be ensured most effectively by reinforcing operations area perimeter conditions as opposed to relying only on distance to avoid breaches of security.

Public safety concerns include proximity to Plant activities, truck traffic, locations of trails near water bodies, and, possible exposure to chemicals. Chemical exposure concerns include the onsite delivery, storage and use of two chemicals harmful to humans: gaseous chlorine and sulfur dioxide. If a leak should occur, each of these chemicals is capable of causing serious injury or death to persons in the area. The Plant is, however, planning to discontinue its use of both chemicals within the next five years and will replace them with substances that do not pose a risk to the public. The Plant may, therefore, wish to forestall the installation of new trails, particularly near or downwind of the chemical storage areas, until the gaseous chlorine and sulfur dioxide are removed.

While much of the Plant lands site, therefore, may not be suitable for public access, particularly in the near term, the Plant could safely consider locating trails along its perimeters, in areas not planned for Plant activities, on levees, and/or in areas removed from vulnerable Plant activities and facilities. The trail suggestions discussed below assume that chlorine and sulfur dioxide are no longer present and that Plant security can be successfully addressed. In some cases, Plant

security may require that trail access be supervised, for example, allowed only as part of a guided tour.

San Francisco Bay Trail. The current preferred alignment for the Primary Spine of the Bay Trail extends from the east side of Coyote Creek, where the Trail has been completed in Milpitas, westerly along part of the south edge of Plant lands, to Zanker Road near the southeast corner of the Plant's Primary Operations Area. It then turns north on Zanker Road and west along Los Esteros Road and Grand Blvd to the Alviso village area and continues west through Alviso streets and along San José's Urban Growth Boundary to connect to Sunnyvale's Bay Trail (Amphion Environmental 2002) (Figure 13). The City's Bay Trail Master Plan also includes proposed Bay Trail Spur Routes on the Coyote Creek Flood Control Levee along the eastern side of Plant lands as well as along the access road (Grand Boulevard) to the Don Edwards National Wildlife Refuge Environmental Education Center (Figure 13).

Taking the amenities of Pond A18 into consideration, the following additional trail alignment opportunities were identified:

1. Option 1- San Francisco Bay Trail Alternative Primary Bay Spine
2. Option 2a- San Francisco Bay Trail Spur Extension
3. Option 2b- Secondary Bay Trail Spur Extension

Figure 13 depicts these trail alignment options in relation to the existing and proposed San Francisco Bay Trail Primary Spine and Spur Routes.

Option 1- Alternative San Francisco Bay Trail Primary Spine. Potential future shoreline flood control improvements may include an improved shoreline levee along the south/southeastern perimeter of Pond A18. This levee would provide an excellent opportunity for the Primary Spine of the Bay Trail because it would connect the proposed short spur terminating at the Don Edwards National Wildlife Refuge Environmental Education Center to the existing Bay trail along the east side of Coyote Creek (Figures 11 and 13). In addition, the new shoreline levee would be an engineered levee providing a relatively wide, level surface for a trail as compared to the uneven surfaces on the existing non-engineered levees. This alignment would be potentially safer for the public (since it would not be along the busy Zanker Road with its truck traffic) and far more aesthetic than the Primary Bay Spine proposed in the City's Bay Trail Master Plan. In addition, this alignment would provide educational opportunities regarding the South San Francisco Bay estuarine ecosystem and the City's stewardship of Pond A18. This option would require installation of pedestrian bridges over Artesian Slough and Coyote Creek and would be most appropriate if Pond A18 were to be converted to tidal marsh. The Plant should be involved in the design of the levee and trail to ensure that the trail is safe and does not provide access to vulnerable Plant features.

Option 2a- Bay Trail Spur Extension. The Coyote Creek Flood Bypass levee along the north side of Pond A18, with its existing 7,500-foot long "Public Recreation Easement", presents an excellent opportunity for locating a pedestrian and bicycle trail. A trail at this location could be either part of the San Francisco Bay Trail system or could be a local trail. In either case, such a trail would provide substantial recreational, and even educational, benefits to the public. It

would allow public access out to the confluence of Coyote Creek and Coyote Slough and could provide the platform for observing any educational or otherwise interesting activities occurring within Pond A18. Should the Plant conclude that a trail at this location could pose a threat to Plant security or to the safety of persons using the trail, access to the trail could be limited to guided tours.

Option 2b- Secondary Bay Trail Spur Extension. Should the Option 2a Bay Trail Spur alignment be endorsed by all parties involved, the Plant may want to consider an additional future spur extension down the west side of Pond A18. A pedestrian bridge across Artesian Slough would be necessary to connect this spur with a proposed short Bay Trail Spur near the Don Edwards National Wildlife Refuge Environmental Education Center (Figure 13). This would form a loop connected to the primary Bay Trail alignment at Coyote Creek and at the west end of Los Esteros Road. Implementation of this trail spur would require improvements to the surface of this non-engineered levee segment.

If the suggested Bay Trail Spur extensions prove to be unsuitable for the Bay Trail system, the Public Recreation Easement along the north edge of Pond A18 should still be considered for development of a local trail. Not only are views from the levee apt to be spectacular and informative, but a trail or trails around the pond would provide the necessary access for public observation of any activities of interest within the pond. Access to this trail could, of course, be limited to guided tours if the Plant determines that unsupervised access would pose a security threat to Plant operations or a safety hazard for persons using the trail.

West Side of Coyote Creek. The City's Bay Trail Master Plan proposes a San Francisco Bay Trail Spur on Plant lands along the west side of Coyote Creek (Figure 13) (Amphion Environmental 2002).) That trail also would be a great public benefit whether it was part of the Bay Trail system or a local trail. In either case, it could ultimately link up with the "Pond A18 trail" discussed above and/or with other existing and planned Coyote Creek trail segments to the south, running along most of the length of Coyote Creek within San José.

Other Pedestrian and Bike Trail Opportunities. In addition to the Bay Trail system opportunities discussed above, there are opportunities for local pedestrian and bike trails around the remaining perimeter of the Plant lands. Local trails at the south edge along 237 and the west edges near Alviso could tie into public streets and provide access to other public use areas. In addition, trails may be feasible at interior locations, for example, within various access easements and designed into the Plant expansion area. Trails that lead to the sloughs, to the Bay and into the Alviso village area to the west would have particular public appeal.

Environmental Education Opportunities

Educational activities for the public should be structured to take advantage of the variety of ecosystems and species that are present on Plant lands. Education programs should be selected on the basis of how well they relate to the local environment and how well they can function without significant property improvements. While education programs should also be considered interim, it may be necessary to provide the occasional small classroom or storage building to adequately support them. Programs that take place outdoors should be encouraged.

While the south area of the Plant lands, particularly the three areas called out in the recreation discussion above, could also be the preferred location for environmental education programs, actual locations could be much more flexible. For those educational activities that are very mobile, for example a group of people on a walking tour, locations may be limited primarily by the ecosystem to be studied. Programs requiring buildings should be located carefully, to sites that will remain available over a longer term. Preferred locations would include sites near the Plant main offices and parking lot on both sides of Los Esteros Road (to share parking and general oversight) and sites near environmental features of interest, e.g. near Coyote Creek or Artesian Slough. Building sites and design should be selected for their ability to share and take advantage of existing facilities, utilities and human presence and/or to become physically and programmatically integrated into an area that might support education objectives. Environmental education topics might include:

- Plant, bird, fish and animal species of the area and their habitats
- Migratory birds
- Hydrology of the area
- Coyote Creek riparian corridor
- Biotic history of the area
- Plant operations and programs
- Environmental mitigation areas
- Salt processing history
- South Bay estuarine ecosystem
- Gardening in Alviso area soils and climate

Relationship to Land Use Planning Goals

The Public Trail and Environmental Education opportunities would support the City's land-use planning goals as follows.

Flexibility for Plant Land-Uses. Goals Rating (0). None of the trail or environmental education options discussed above should be expected to significantly constrain flexibility for the Plant's use of its lands if trail and education sites are selected to avoid likely Plant functions. Trails would most naturally be located in areas not suitable for Plant use and not in proximity to Plant functions susceptible to harm from passers-by. Any building or structure provided for environmental education programs might constrain Plant flexibility if it were not possible to locate it outside of areas required for future Plant purposes.

Regulatory Compliance. Goals Rating (0). Trails should have no affect on regulatory compliance.

Worker and Community Safety. Goals Rating for Public Access (-); Goals Rating for Environmental Education (0). Trails and environmental education would have little or no effect on worker and community safety, assuming that the gaseous chlorine and sulfur dioxide are removed from the Plant site before these amenities are constructed. Removal of those chemicals can be considered a major risk reduction for persons living or working in proximity to the Plant. In addition, there may be some concern about trail users falling off a trail into the adjacent pond, creek or slough. Trails should be designed and built with safety in mind, but

trails along waterways are commonplace and it is generally understood that people have to take some responsibility for their own safety. Notices posted along any trail route should include reminders about safe practices in using all recreational facilities on or near Plant lands.

Habitat Protection and Restoration. Goals Rating (+). Trails and education facilities could impact wildlife use depending on their proximity to sensitive habitats. However, long-term positive effects more than offset this potential negative effect. People who learn to appreciate the value of various habitats tend to be those who later will promote protection and restoration efforts. Notices posted along any trail route should include reminders about the value and fragility of the visible ecosystems and the importance of maintaining these habitats.

Good Neighbor and Public Value. Goals Rating (+). With any of these facilities in place, the Plant would be perceived as a good neighbor. Beginning to reach out to nearby neighborhoods and communities would also create the opportunity to build a public understanding and appreciation of Plant functions and achievements, and be perceived as another kind of good neighbor. Notices posted along any trail route should include reminders about the primary purpose of the Plant facilities, and the value to the community of having access to trails on or near Plant lands.

The public value of these facilities would be enormous, providing the public opportunities for education about their environment, healthy exercise, and aesthetic delight, as well as providing the public with an appreciation of the importance of the Plant in an economically viable and healthy community.

Economic Opportunities. Goals Rating (-). There is little opportunity for trails and educational programs to generate income for the Plant or to help it cut costs. In fact, the City and/or the Plant may have to assume the financial responsibility for building and maintaining trails and buildings.

Capital Cost

The capital cost associated with the public access/public trail opportunity is rated as Low to Moderate depending on the length of the trail segment and the complexity of design and construction (<$1 million). However the cost for environmental education is rated as Moderate (($1 million - $10 million). Trails and environmental education are unlikely sources of income for the Plant. In fact the Plant may expect to share in the cost of creating and maintaining whatever trails and educational facilities are ultimately constructed on its lands. Partners and/or major contributors would be the City of San José, the SCVWD and, perhaps, the San Francisco Bay Trail organization. Major trail segments without environmental or hydrologic complications can probably be built for under $10 million while educational facilities would vary widely depending on their size, purpose, features, etc. A small, simple environmental education building may cost considerably less than $10 million. Both types of projects could actually cost a great deal more depending on size and complications. That information is not available at this time.

Constraints

Public Safety. Public safety related to the use and storage of gaseous chlorine and sulfur dioxide can only be considered a short-term risk. The safety issue can be addressed by simply limiting or avoiding new public access opportunities until those chemicals are eliminated from the Plant.

Because the current planned alignment for the Bay Trail follows Zanker and Los Esteros Roads, landfill traffic on Zanker and Los Esteros Roads would share the roadway with future Bay Trail users (pedestrians and bicyclists), creating a public safety issue.

Security Risks to Plant. Because the Plant is a critical public service located on a sprawling and somewhat isolated site, security has required that much of the site remain closed to unsupervised public access. Plant management personnel have legitimate concerns about the security of Plant operations; operations would be vulnerable to mischief or mayhem directed at the Treatment Plant itself. The Plant may need to identify which of its operations/activities require protection and how best to provide it before some specific public access decisions are made. Keeping the public at a distance may, in some cases, be less effective than strengthening perimeter conditions around strategic operations areas.

In general, however, public access can be controlled (e.g., fenced, restricted to levees). In addition, all public access to Plant lands need not be unsupervised; supervised and/or limited access could be developed for many activities, particularly for educational programs.

Odors. Odors generated by the suite of land uses (i.e. landfills, recycling facilities, the Plant, salt ponds) and tidal habitats on and adjacent to Plant lands poses a constraint to public access for recreation and environmental education. Proximity to odor generating facilities should be considered in the selection of trail and environmental educational facilities.

Biology. Increased recreational access to areas in which sensitive wildlife species occur can impact wildlife. However, no sensitive wildlife species currently use the alignment of the proposed Bay Trail or Bay Trail Spur Extensions. California Clapper Rails and Burrowing Owls could potentially occur adjacent to these alignments, particularly if Pond A18 is restored to tidal marsh. However, special-status species would not pose a significant constraint to the proposed alignments.

OPPORTUNITIES RATING

The development of land use alternatives will involve selecting and likely combining opportunities to create land-use alternatives that respond to varying degrees to the goals. On November 9, 2006, H. T. Harvey & Associates (Scott Terrill, Max Busnardo, and Donna Ball) met for a collaborative meeting with representatives from City Staff (Kerrie Romanow, Kirsten Struve, Paul Prange, and Matt Krupp) and the West Valley Sanitation District (Bob Reid) to discuss the Opportunities/Goals Matrix ratings for both the Plant lands and Pond A18. Meeting participants reviewed the Land-Use Master Planning Goals presented below in Table 4 to evaluate the impact of each opportunity in meeting the individual goals. While many of the opportunities may provide negative or positive impacts that could be extrapolated to the City or County, the ratings included in this report were determined solely on the basis of their net impact as related to the Plant lands or Pond A18.

The following criteria were used to provide the ratings included in the Matrices for both the Plant lands (Table 5) and Pond A18 Table 6). The Matrix for Pond A18 is included in this report for the ease of evaluating costs for opportunities that involve both the Plant Lands and Pond A18. The individual opportunities for Pond A18 are fully described in the Pond A18 Opportunities and Constraints Report (H. T. Harvey & Associates and others 2006).

0	=	No net impact (or neutral impact) of the opportunity on meeting the goal.
-	=	Net negative impact (without additional effort/mitigation) of the opportunity on meeting the goal.
+	=	Net positive impact of the opportunity on meeting the goal.
++	=	This rating was used for comparisons between similar opportunities.

In addition, the Matrices rank the capital costs for each opportunity. Rankings for the capital costs were based on the following criteria:

- Low - $ 1 million and could be funded under the existing operating budget and staff. A low rated opportunity could be accomplished in less than two years.

- Moderate – $ 1 million - $10 million and would require only minor changes to the existing operating budget. These opportunities could be accomplished in approximately two years.

- High – $10 and 100 million and would require a large capital investment. These opportunities would take greater than two years to implement.

- Very High – > $100 million and would require a large capital investment; accomplishment of this goal would require numerous years.

The cost rating includes the cost of design, environmental clearance, and construction.

Table 4. Plant Land-Use Planning Goals.

Goals	Explanatory Sentence ("The Plant aims to…")
Flexibility for Plant Uses	Operate more cost-effectively and anticipate future Plant needs for capacity, treatment, and reliability improvements.
Regulatory Compliance	Meet and exceed current Federal, State, and regional regulatory requirements while providing new opportunities for recycled water utilization.
Worker and Community Safety	Minimize toxic hazards and replace them with less hazardous alternatives.
Habitat Protection and Restoration	Encourage environmentally positive outcomes consistent with the SBSP Restoration Project effort that will increase wildlife habitat, reduce flood risk, and conserve energy.
Good Neighbor and Public Values	Improve integration and acceptance with the local community by becoming an ecological asset of natural beauty and free of odor
Economic Opportunities	Allow complementary, sustainable land uses that either generate revenue or reduce costs while providing flexibility for future growth.

Table 5. Plant Lands Opportunities/Goals Matrix.

OPPORTUNITIES	GOALS						
	Flexibility for Plant Land Uses	**Regulatory Compliance**	**Worker and Community Safety**	**Habitat Protection and Restoration**	**Good Neighbor/ Public Value**	**Economic Opportunities**	**Capital Cost Ranking**
Plant expansion	+	+	+	-	0	0	Very High
Water recycling facilities expansion	+	+	0	0	+	+	Very High
Interim land uses for plant expansion area and buffer lands/Mini-Rec Facilities	-	+	0	-	++	-	Low per facility
Interim land-uses for Plant expansion area and buffer lands/Agriculture	0	+	0	0	+	0	Revenue Generating
Interim land-uses for plant expansion area and buffer lands/Constructed wetlands	-	+	0	+	+	0	Moderate[1]
Biosolids odor reduction opportunities	0	+	0	-	+	0	Moderate-Odor Wall High-Drying Bed Relocation
Riparian corridor widening along Lower Coyote Creek	-	+	+	+	+	+	Moderate
Restoration of riparian to tidal habitat transition zone along Lower Coyote Creek-Coyote Slough	+	+	+	++	+	0	Moderate [2]
Flood protection improvements – South San Francisco Bay Shoreline Study	+	+	+	-	+	+	Potential for Federal, State and Local cost share[3]
Co-composting facility (Assumes that facility is enclosed)	+	+	+	0	Unknown	+	High
Regional Biosolids Processing Facility (Assumes that facility is enclcosed)	0	0	0	0	-	+	Very High

OPPORTUNITIES	GOALS						
	Flexibility for Plant Land Uses	**Regulatory Compliance**	**Worker and Community Safety**	**Habitat Protection and Restoration**	**Good Neighbor/ Public Value**	**Economic Opportunities**	**Capital Cost Ranking**
Biosolids Monofill	0	0	0	-	0	0	Moderate
Biosolids or co-compost for tidal marsh restoration	+	0	0	+	+	+	Cost Savings
Solar Power Generating Facilities	+	0	0	-	0	+	High
Soil Stockpiling for Construction Projects	0	-	-	-	-	+	Revenue Generating
Public access	0	0	-	+	+	-	Low to Moderate[4]
Environmental education	0	0	0	+	+	-	Moderate

[1]Assumes less than 50 acres of constructed seasonal wetlands.

[2]Assumes that fill may be required to raise the floodplain and that the CC flood control levee may need to be moved will raise this cost to "Moderate." Small-scale restoration could possibly rank as "Low."

[3]Uncertain at this time on how the Federal-local cost share would work (i.e., whether the City or SCVWD would be responsible for a local match). The emphasis on this cost rank is to indicate a benefit from the Federal cost share, rather than basing the rank on the local match (undefined).

[4]Cost would depend on the length of trail and complexity of design and construction.

Table 6. Pond A18 Opportunities/Goals Rating.

OPPORTUNITIES	GOALS						
	Flexibility for Plant Land-Uses	**Regulatory Compliance**	**Worker and Community Safety**	**Habitat Protection and Restoration**	**Good Neighbor / Public Value**	**Economic Opportunities**	**Capital Cost**
Restore tidal marsh habitats	0	+	0	++	+	0	Moderate (~$5 million with no transition zone) to High (~$50 million with the transition zone)
Flood protection improvements – South San Francisco Bay Shoreline Study	+	+	+	-	+	+	Potential for Federal, State and Local cost share[3]
Install pulsed-discharge wastewater wetlands	+	+	+	+	+	-	High[1]
Standard wetland treatment	+	+	+	+	+	-	High[1]
Managed pond for shorebird breeding	0	0	0	+	+	-	Low[2]
Relocate/expand sludge drying beds	+	-	0	0	+	0	High
Develop a wetlands mitigation bank	0	+	0	0	+	+	See costs for Tidal Marsh Restoration above
Improve public access	-	-	-	-	+	-	

[1]Capital costs are expected to be at the lower end of this range.
[2]Managed pond costs for Pond A18 are estimated using the SBSP A16 conceptual costs ($4.5 million) and assumes that the density of breeding islands would be greatly reduced for Pond A18 compared to A16.

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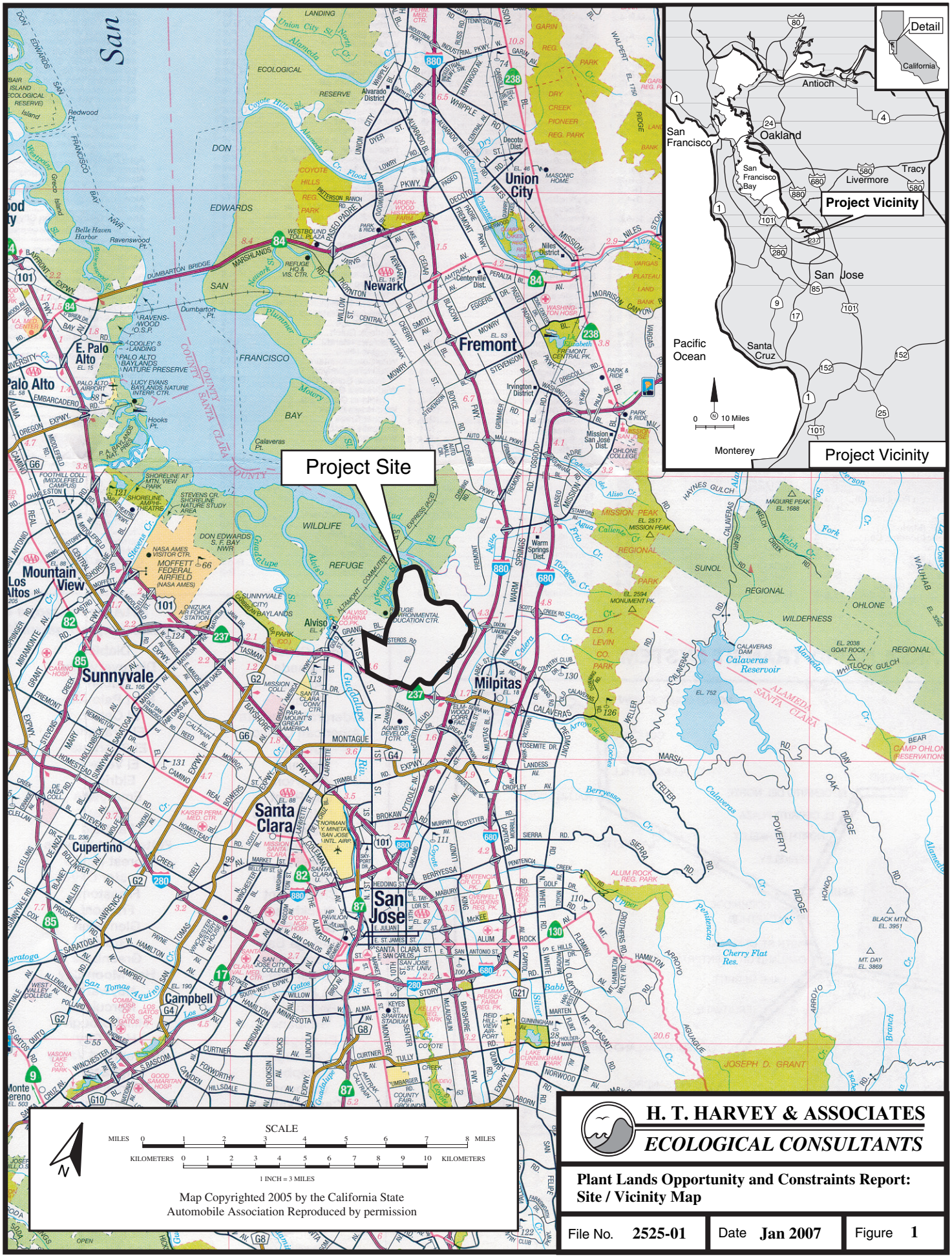
FIGURES



H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

Plant Lands Opportunity and Constraints Report: Site / Vicinity Map

File No.	Date	Figure
2525-01	**Jan 2007**	**1**

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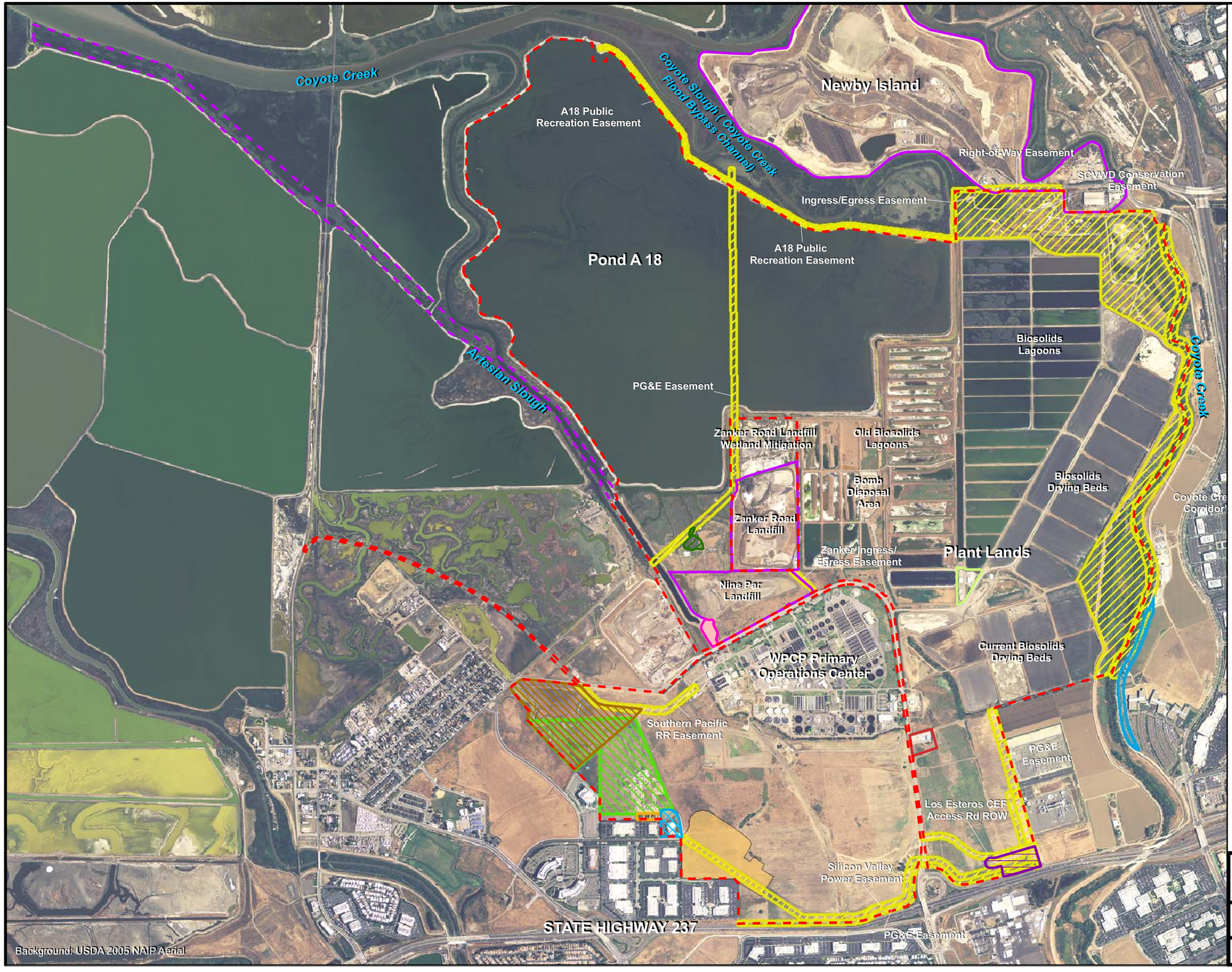
Plant Lands Opportunities & Constraints Report: Land-Use Planning Area (Plant Lands & Pond A18)

File No. 2525-01	Date Jan. 2007	Figure 2

H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

Plant Lands Oppurtunities & Constraints Report: Distribution of Existing and Proposed Land Uses

File No. 2525-01	Date Jan. 2007	Figure 3



LEGEND

- Land-Use Planning Area (Plant Lands & Pond 18)
- Outflow Channel
- Burrowing Owl Management Area
- Easements
- Lease Arzino Horse Ranch
- Lease Jubilee Church
- Lease McCarthy Strip
- Landfills
- Mitigation Sites
- Residual Solids Management Operations Center
- San Jose Muni-Water Tank
- South Bay Water Recycling Fill Station
- South Bay Water Recycling Transmission Pump Station
- Los Esteros Critical Energy Facility (LECEF)
- Public Safety Driver Training Facility

N

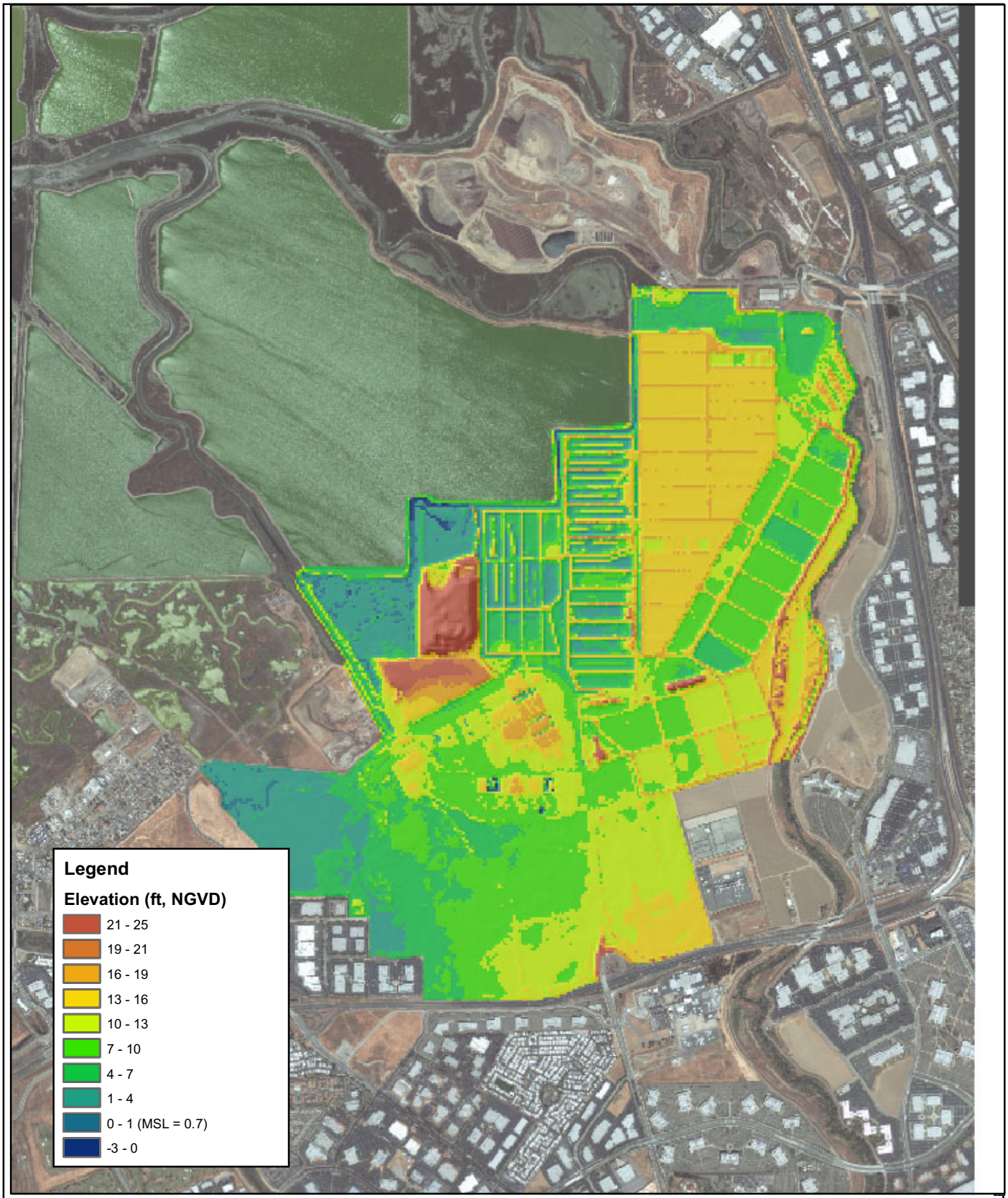
0 1,600 3,200

Feet

H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

Plant Lands Opportunities & Constraints Assessment: Existing Land Uses, Easements & Leases

File No. 2525-01	Date Jan. 2007	Figure 4



Background Image Source: IKONOS imagery, aquired by Space Imaging on May 8, 2004
Figure Source: PWA

N

0 1,000 2,000 3,000 4,000 5,000 Feet

10 acres

H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

Plant Lands Opportunities and Constraints Report:
Plant Lands Elevation Map

File No. **2525-01**	Date **Jan 2007**	Figure **5**

Notes: Floodplains are shown for the extent between Guadalupe River and Coyote Creek only; floodplain limits outside of this extent are not shown.
Background Image Source: IKONOS imagery, aquired by Space Imaging on May 8, 2004
USACE (1988) Coastal Floodplain
Figure Source: PWA

N

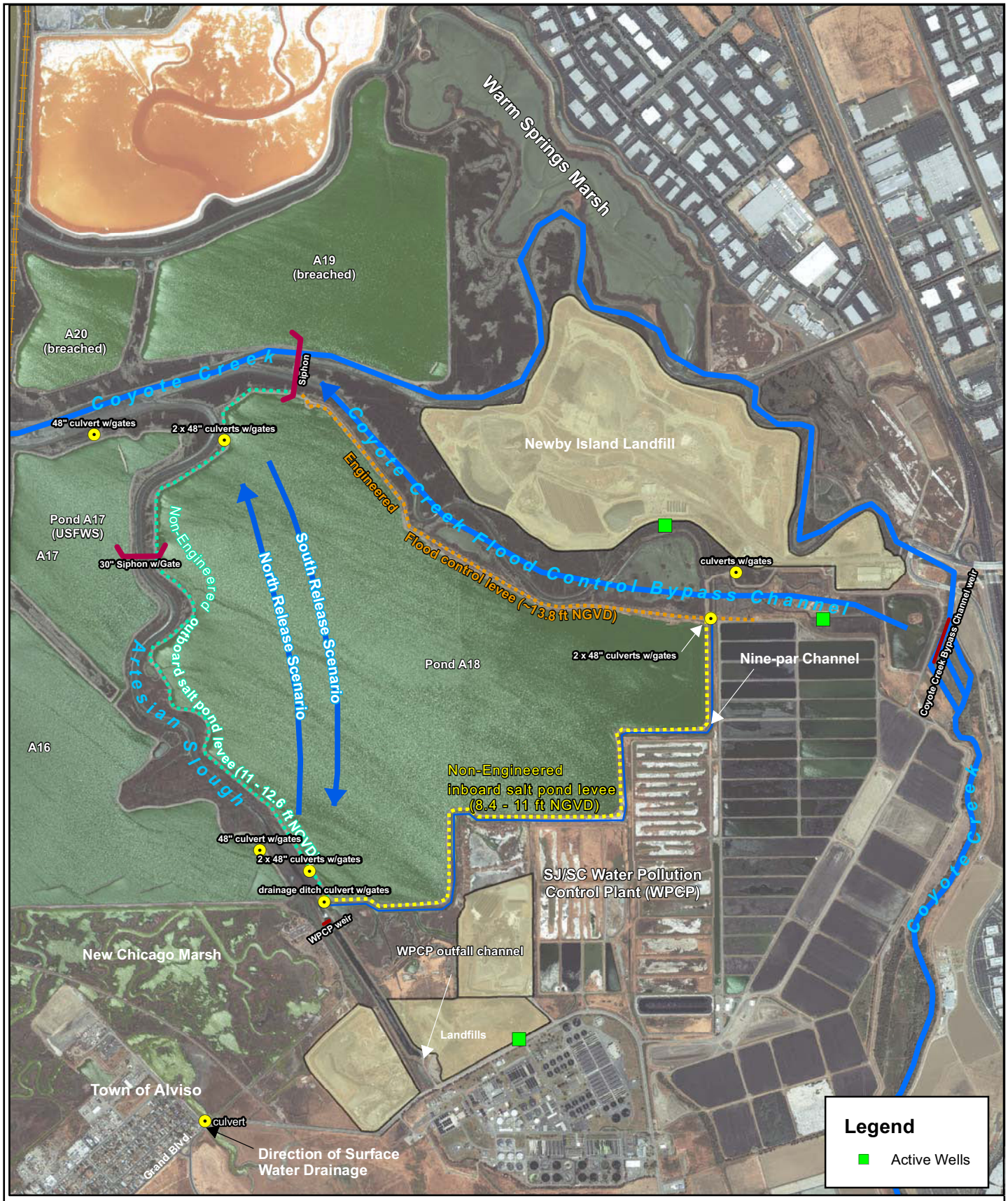
0 1,000 2,000 3,000 4,000 5,000 6,000 Feet

10 acres

H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

Plant Lands Opportunities and Constraints Report:
Plant Lands Floodplain Locations

File No. 2525-01	Date Jan 2007	Figure 6



Note: Both siphons are planned to be closed.
Background Image Source: IKONOS imagery, aquired by Space Imaging on May 8, 2005
Base Map Courtesy: PWA

N

0 1,000 2,000 3,000 4,000 Feet

10 acres

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Plant Lands Opportunities and Constraints Report: Existing Hydrologic Structures

File No. 2525-01	Date Jan 2007	Figure 7

Background: USDA NAIP Aerial 2005

Legend

- PGE Towers
- Board Walks
- SCVWD Salt Marsh Harvest Mouse Mitigation area
- SCVWD Waterbird Pond Mitigation Area

Biotic Habitats (2006)

- Bareground/ Peripheral Halophyte Zone
- Coyote Brush Scrub (CBS)
- Freshwater Marsh
- Non-native Grassland
- Non-tidal Brackish Marsh
- Non-tidal Salt Marsh
- Tidal Salt Water Marsh
- Tidal Fresh Water Marsh
- Open Water
- Riparian Woodland
- Ruderal
- Ruderal/Open Water
- Saline Grassland
- Salt Panne/Open Water
- Seasonal Wetland
- Sludge Ponds
- Developed/Landscaped

Coyote Creek
Newby Island
Pond A18
PGE Towers
PG&E Power Lines
Artesian Slough
Pond A16
Zanker Road Landfill Wetland Mitigation
Old Biosolids Lagoons
Zanker Road Landfill
Old Biosolids Lagoons
Biosolids Lagoons
Coyote Creek
Biosolids Drying Beds
STATE HIGHWAY 237
N 1ST SREET

N 0 1,500 3,000 Feet

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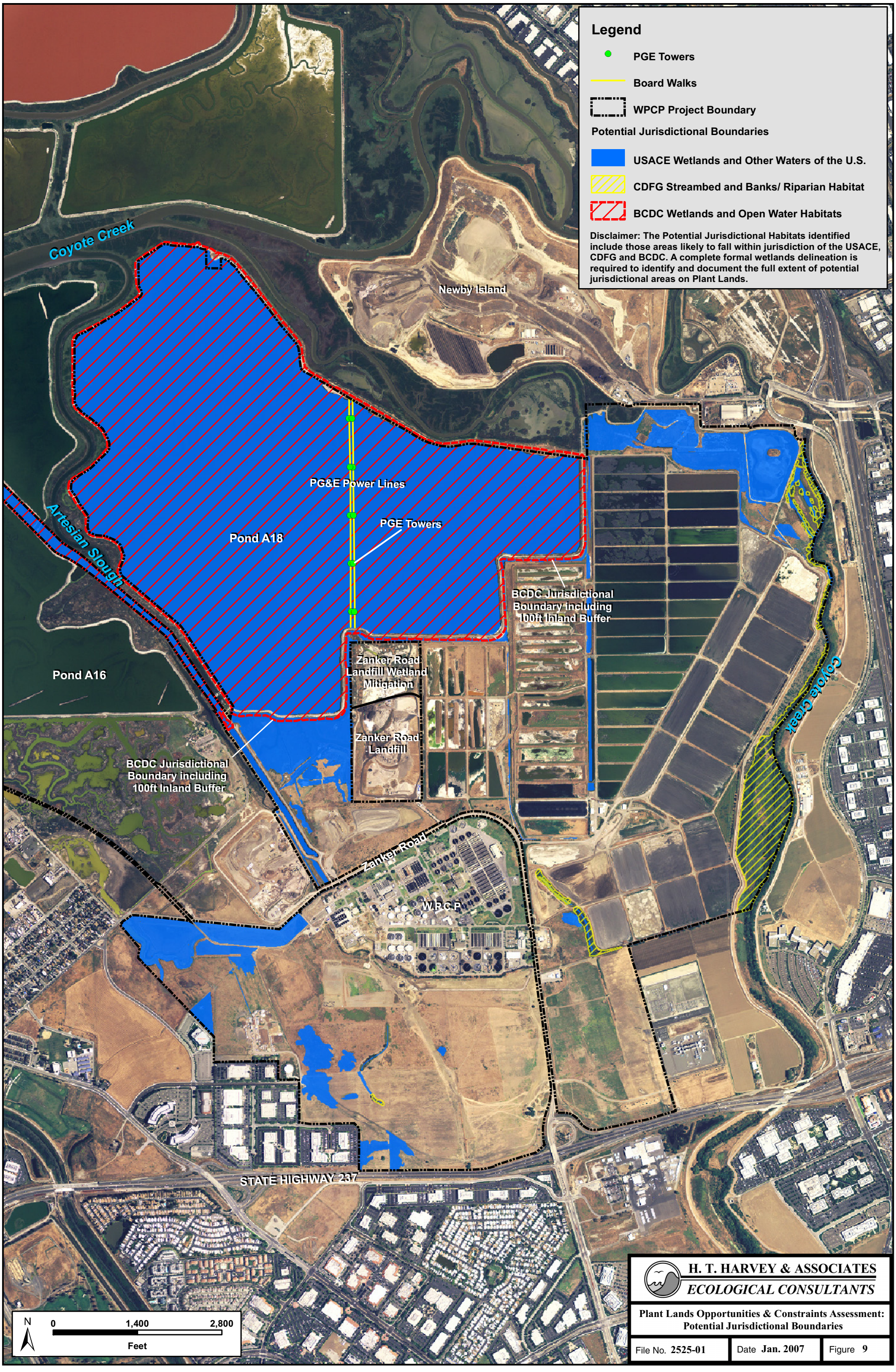
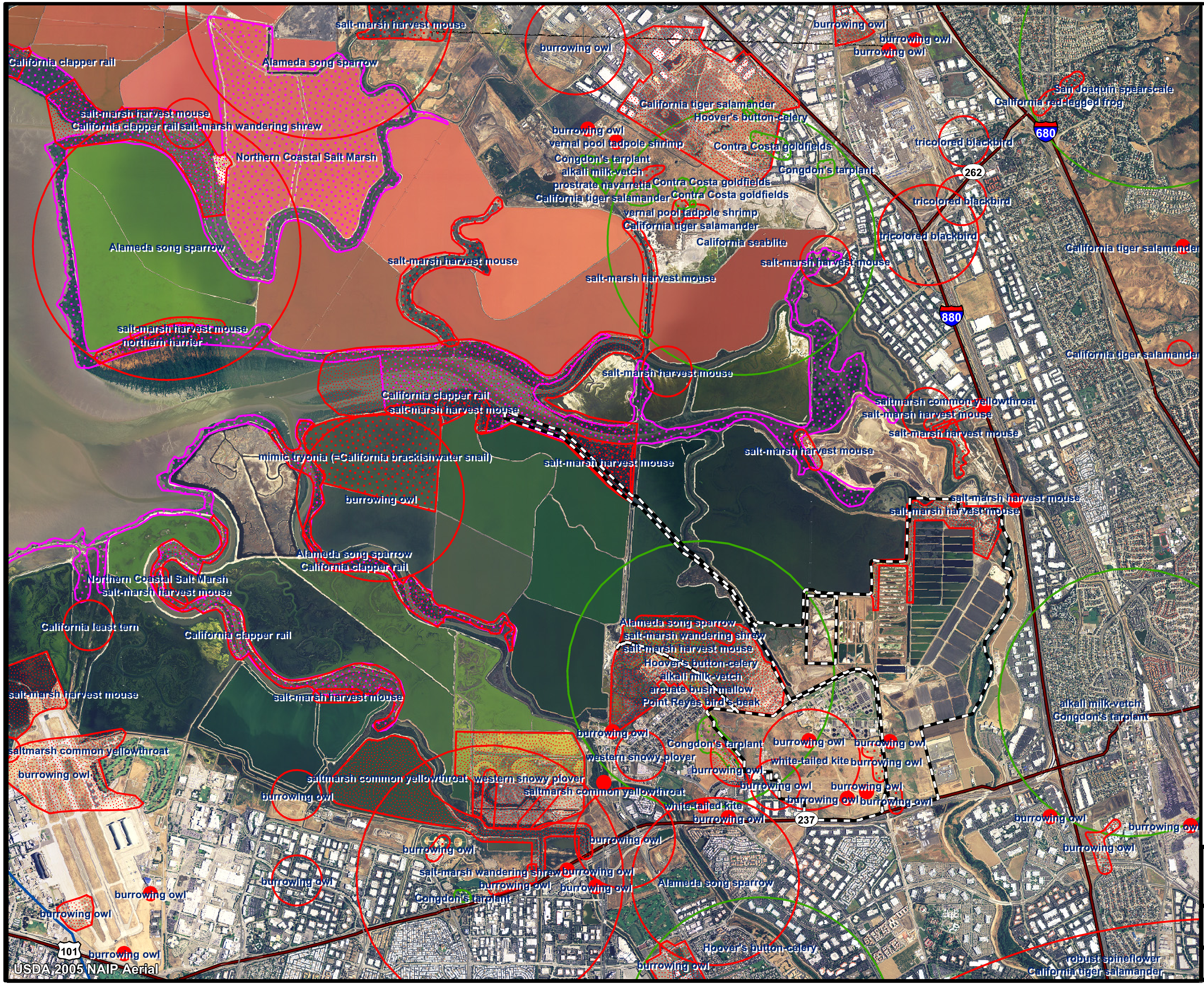
Plant Lands Opportunities & Constraints Assessment: Plant Lands Distribution of Biotic Habitats

File No. **2525-01**	Date **Jan. 2007**	Figure **8**


Legend
PGE Towers
Board Walks
WPCP Project Boundary
Potential Jurisdictional Boundaries
USACE Wetlands and Other Waters of the U.S.
CDFG Streambed and Banks/ Riparian Habitat
BCDC Wetlands and Open Water Habitats
Disclaimer: The Potential Jurisdictional Habitats identified include those areas likely to fall within jurisdiction of the USACE, CDFG and BCDC. A complete formal wetlands delineation is required to identify and document the full extent of potential jurisdictional areas on Plant Lands.
Coyote Creek
Newby Island
PG&E Power Lines
PGE Towers
Pond A18
Artesian Slough
Pond A16
BCDC Jurisdictional Boundary including 100ft Inland Buffer
Zanker Road Landfill Wetland Mitigation
Zanker Road Landfill
BCDC Jurisdictional Boundary including 100ft Inland Buffer
Zanker Road
W.P.C.P
Coyote Creek
STATE HIGHWAY 237
N
0
1,400
2,800
Feet
H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS
Plant Lands Opportunities & Constraints Assessment: Potential Jurisdictional Boundaries
File No. 2525-01
Date Jan. 2007
Figure 9



CNDDB Legend

Animals

- Specific Location
- Approximate Location
- General Area

Plants

- Specific Location
- Approximate Location
- General Area

Terrestrial Communities

- General Area

Project Location

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Plant Lands Opportunities & Constraints Assessment: CNDDB Map

File No. 2525-01	Date Jan. 2007	Figure 10

Background: USDA NAIP Aerial 2005

Legend

- WPCP Boundary
- New Flood Control Levee
- Pulsed - Discharge Wastewater Wetland
- Tidal Marsh Restoration
- Restored - Tidal Marsh Transition Zone
- Widened Riparian Corridor
- Possible Public Trail
- Relocation of Biosolids Lagoons and Drying Beds

Coyote Creek

Pulsed Effluent Discharge to Bay

Newby Island

Coyote Slough (Coyote Creek Flood Bypass Channel)

New Levee

Riparian - Tidal Marsh Transition Area

Pulsed - Discharge Wastewater Wetland or Wastewater Wetland (not pulsed)

Tidal Marsh Restoration

Levee

Artesian Slough

Biosolids Lagoons

Old Biosolids Lagoons

Biosolids Drying Beds

Zanker Road Landfill Wetland Mitigation

Pond A16

Old Biosolids Lagoons

Zanker Road Landfill

Bomb Disposal Area

Widened Riparian Corridor

Effluent Discharge to Wastewater Wetland

Biosolids Drying Beds

N 1ST SREET

STATE HIGHWAY 237

N

0 1,200 2,400

Feet

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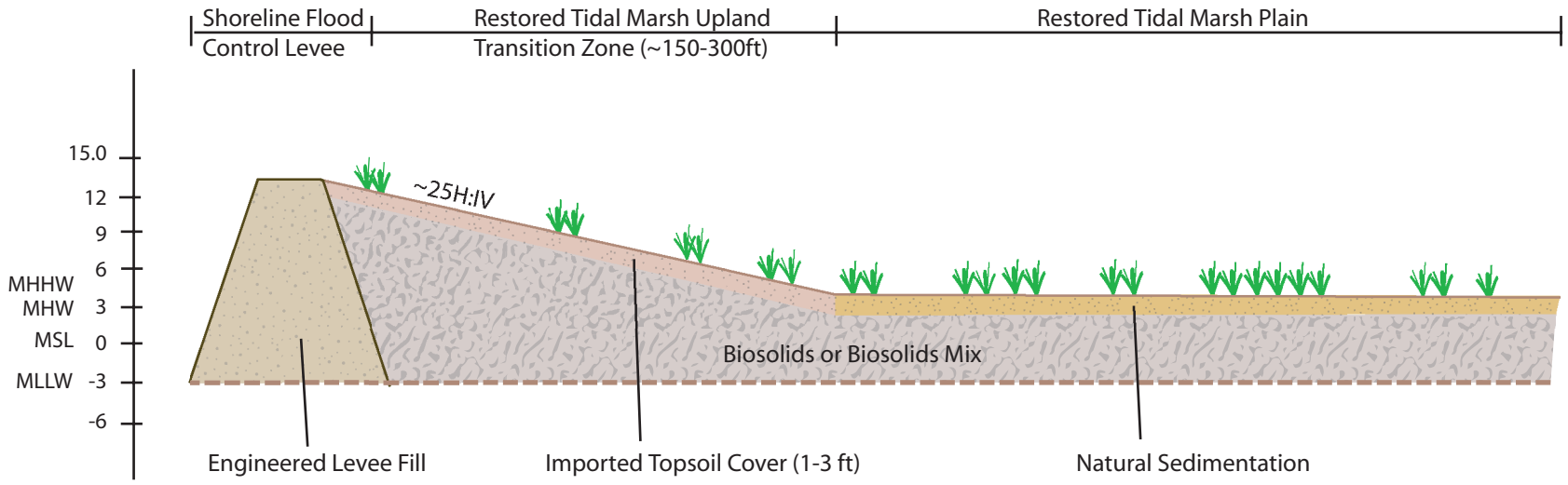
Plant Lands Opportunities & Constraints Assessment: Example of a Preliminary Land-Use Alternative

File No. **2525-01**	Date **Jan. 2007**	Figure **11**



Not -to - Scale

Legend

Subsided Salt Pond Surface (Starting Elevation)

Design Grade (Final Elevation)

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Plant Lands Opportunities and Constraints Report: Biosolids Reuse for Tidal Marsh Restoration

Proj No. 2525-01	Date Jan 2007	Figure 12
DV	H:\Project Files\2525\01\Plant Lands Opp & Constraints\Figure 12Cross.ai	

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Plant Lands Opportunities & Constraints Report: Public Trail Opportunities

File No. **2525-01**	Date **Jan. 2007**	Figure **13**

Figure 1. Site/Vicinity Map

Figure 2. Land-Use Planning Area (Plant Lands & Pond A18)

Figure 3. Distribution of Existing and Proposed Land Uses

Figure 4. Existing Land Uses, Easements & Leases

Figure 5. Plant Lands Elevation Map

Figure 6. Plant Lands Floodplain Locations

Figure 7. Existing Hydrologic Structures

Figure 8. Plant Lands Distribution of Biotic Habitats

Figure 9. Potential Jurisdictional Habitats

Figure 10. CNDDB Map

Figure 11. Example of a Preliminary Land-Use Alternative

Figure 12. Biosolids Reuse for Tidal Marsh Restoration

Figure 13. Public Trail Opportunities

APPENDIX A.
OVERVIEW OF CO-COMPOSTING TECHNOLOGIES

OVERVIEW OF CO-COMPOSTING TECHNOLOGIES

INTRODUCTION

Co-composting is an approved technology for producing material from biosolids that meets Class A pathogen standards under the Federal Part 503 Rule if the following conditions are met:

- Using either in-vessel composting or aerated static pile composting, the temperature of the biosolids must be maintained at 55°C (131°F) or higher for 3 consecutive days.
- Using the windrow composting method, the temperature of the biosolids must be maintained at 55°C (131°F) or higher for at least 15 consecutive days. During the period when the compost is maintained at 55°C (131°F) or higher, the windrow must be turned a minimum of five times.

A schematic diagram of a typical composting process is shown in Figure A-1. Composting steps include mixing biosolids with organic amendments, composting the mixture for 20 to 22 days, screening the composted material to recover amendments, curing the composted material for a period of about one to six months and, finally, delivering the product to the market or end use.

Tables A-1 and A-2 list the average macronutrient concentrations and availability of nutrients in compost derived from green waste co-composted with biosolids, and agricultural waste (manure, feathermeal, bedding, etc.). The data are from a report *Use of Compost and Co-Compost as a Primary Erosion Control Material* (CIWMB 2000). As shown in the tables, biosolids-based compost has higher nitrogen and phosphorous content than other types of compost. In addition, the availability of nutrients is generally greater in biosolids-based compost. Notably, however, the availability of potassium is greater in other types of compost.

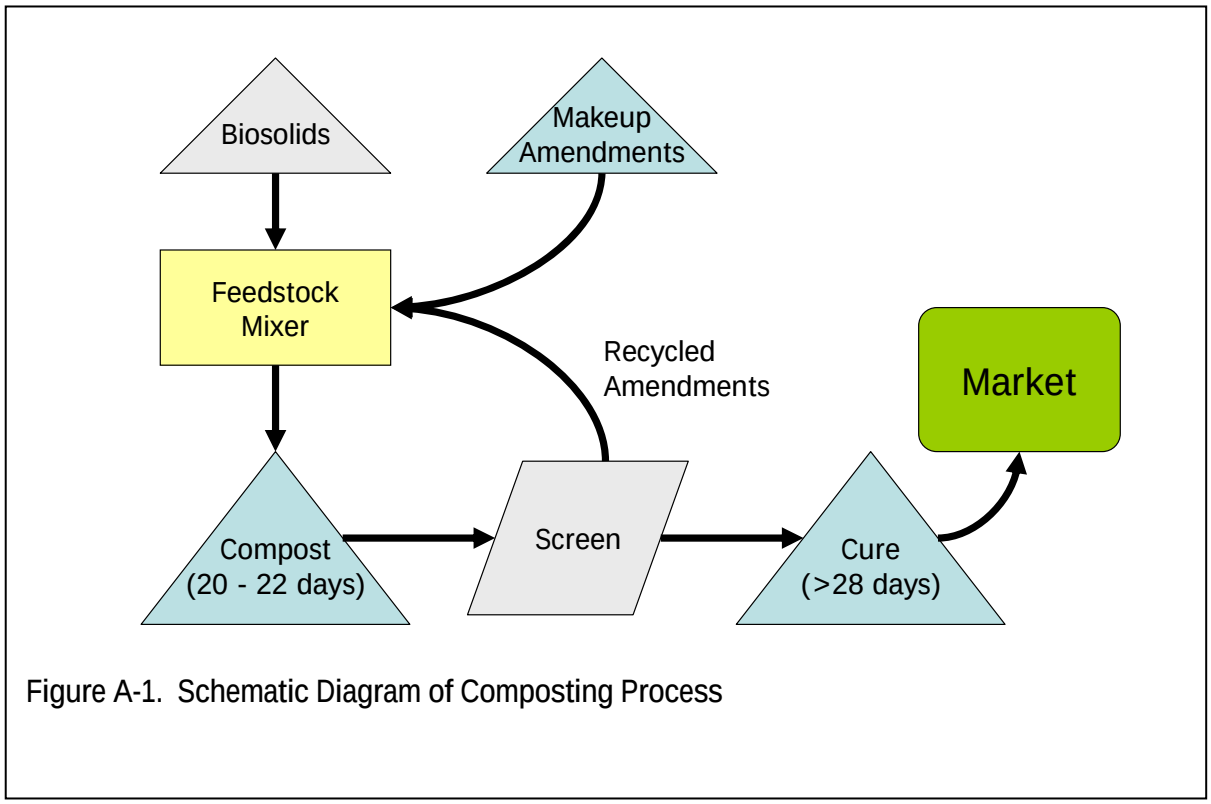

Figure A-1. Schematic Diagram of Composting Process

Table A-1 Macro-nutrients in Different Types of Compost*

Type	GMC	CCM	AGC
Number of Sources	14	4	3
% N	1.25	1.93	1.3
% P	0.25	1.51	1.15
% K	0.84	0.42	2.14
% Ca	2.02	2.56	2.96
% Mg	0.59	0.48	0.9
% Na	0.15	0.15	0.4

GMC = Green Material Compost
CCM = Co-composted Material (biosolids and green material)
AGC = Agricultural Byproduct Compost
*(CIWMB, 2000)

Table A-2 Comparison of Density and Available Nutrient Content of Composts*

Parameter	Test Method	GMC	CCM	AGC
Bulk Density (lb. per cy)		1,169	1,295	1,379
Water Content (lb. per cy)		442	457	299
Organic Fraction (lb. per cy)		284	314	253
Mineral Fraction (lb. per cy)		443	525	827
Available Nutrients (mg/Kg)				
NO_3-N	NaCl Extract	200	951	193
NH_4-N	NaCl Extract	142	3,120	353
K	NaCl Extract	6,752	2,899	10,734
Ca	NaCl Extract	4,579	6,449	1,770
Mg	NaCl Extract	1,515	1,427	1,084
PO_4-P	Bicarb Extract	277	730	1,189
Cu	DTPA Extract	6.4	36	41
Zn	DTPA Extract	56	132	113
Mn	DTPA Extract	77	53	79
Fe	DTPA Extract	235	361	283
B	Saturation Extract	2.0	2.3	6.9
Na (% ECe)	Saturation Extract	19	26	84
Cl (meq/L)	Saturation Extract	43	28	134

GMC = Green Material Compost
CCM = Co-composted Material (biosolids and green material)
AGC = Agricultural Byproduct Compost
*****(CIWMB, 2000)

AERATED STATIC PILE COMPOSTING

The aerated static pile composting method was developed by the United States Department of Agriculture in 1975. It is currently operated using biosolids at over 200 facilities in the United States and Canada. The designs range from totally open facilities to totally enclosed facilities. Examples of totally enclosed ASP facilities can be found in Davenport, Iowa and Longmont, Colorado. An indoor facility is also being constructed in southern California as a joint venture between the Inland Empire Utilities Agency and the County Sanitation Districts of Los Angeles (LACSD). An open-air ASP facility is being constructed by Synagro in Kern County. A schematic diagram illustrating the ASP process is shown in Figure A-2, and pictures of an ASP facility are shown in Figure A-3.

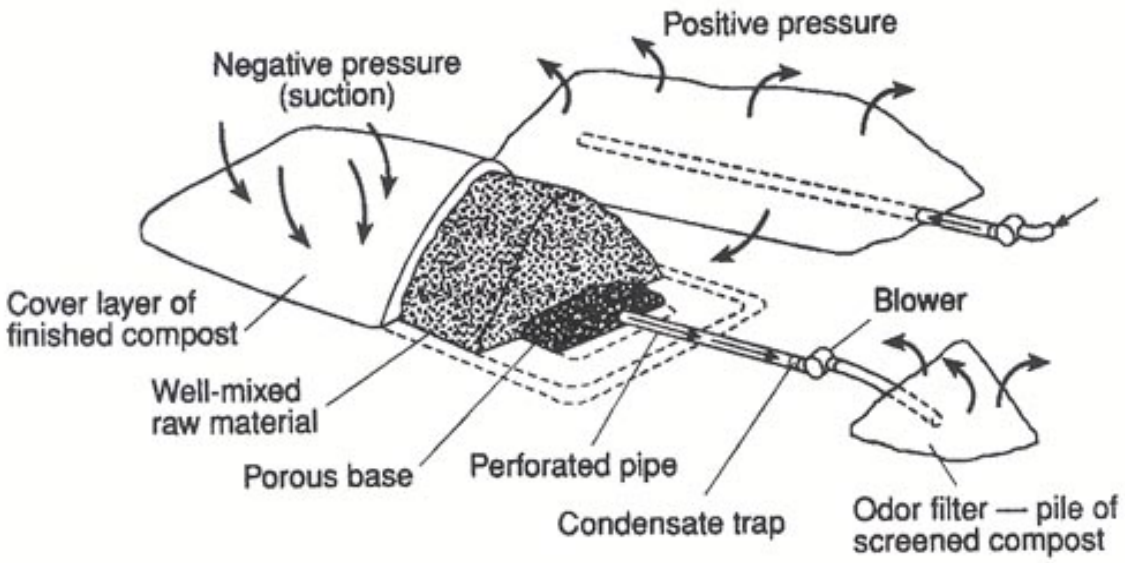

FigurA-2. Diagram of ASP process.

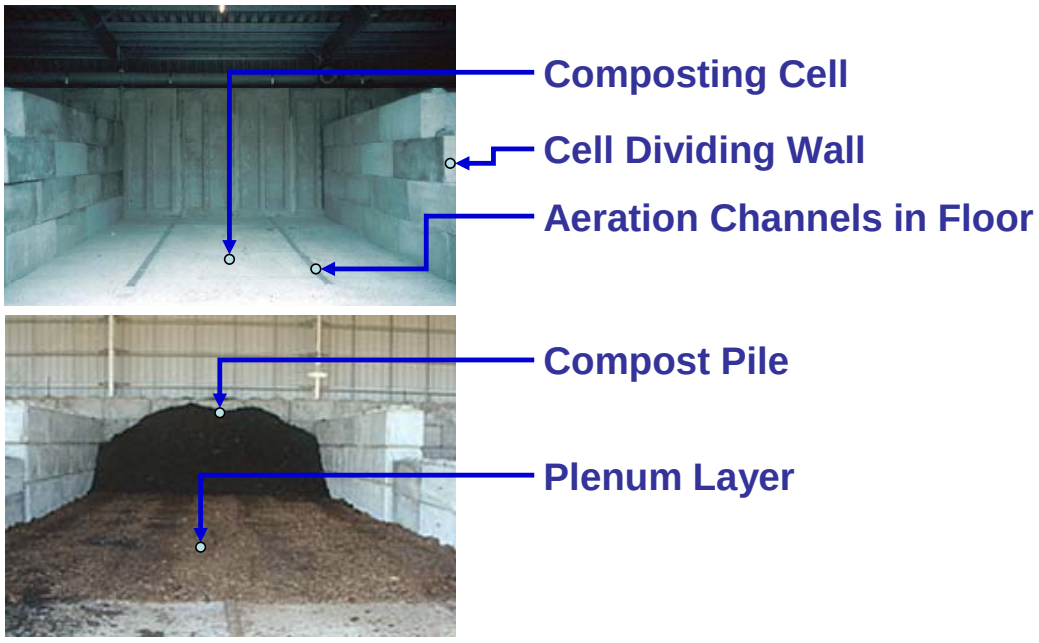

Figure A-3. ASP Facility

This technology was specifically designed to demonstrate improved methods for beneficial use of biosolids by:

- Stabilizing nitrogen into slow-release forms
- Killing disease-causing organisms
- Eliminating objectionable odors

ASP composting is a batch process that can be configured to match sites with various lengths and widths. Piles are constructed by first placing a 0.5-ft deep layer of screened amendments over the aeration system, which is typically integrated with the floor slab. This layer acts as a plenum to distribute air evenly to the pile. Next, mixed feedstock is piled up to 10 feet deep on the base layer. Then a layer of composted but unscreened material is distributed over the top of the pile to act as a blanket that helps retain heat and moisture.

Plenum (base) and cover layers are not necessary during curing because the air demand during curing is significantly reduced and temperature and moisture maintenance are not required. However, to reduce the expense of material handling, piles can be cured in place with the base and cover layers intact.

The piles are usually built using front-end wheel loaders, although larger operations can make good use of conveyors to improve material handling efficiency. The piles are not mechanically agitated except when piles are constructed and torn down. Reversing airflow through the pile can help maintain porosity and improve aeration.

Most systems designed today have provisions for either negative aeration (drawing air downward through the pile) or positive aeration (pushing air upward through the pile). Negative aeration is advantageous because it minimizes surface emissions and captures the exhaust gases, which can be routed through a scrubber before being emitted to the atmosphere. Negative aeration also provides a means to monitor the moisture, temperature, and odor of the exhaust gas before scrubbing. The combined effect of relatively small footprint, less agitation, and negative airflow all work synergistically for odor minimization. The aeration system can be integrated into the concrete floor slab to reduce conflicts with material handling equipment.

The aerated static pile process typically takes 4 weeks of composting plus at least 1 month for curing to make finished compost. During composting, the pile's density, moisture content, and available pore space all affect how efficiently a pile can consume oxygen because these three parameters significantly affect the airflow characteristic through the pile. Therefore, low density and high pore space are desirable when constructing compost piles.

Table A-3 summarizes the advantages and disadvantages of ASP composting.

Table A-3. Advantages and Disadvantages of ASP Composting

Advantages	Disadvantages
Low space requirement compared to windrow composting, which increases material handling efficiency due to shorter travel time. More cost effective compared to windrow composting if an enclosure is needed Few moving parts and minimal equipment are required, which reduces O&M costs and increases reliability. Odor containment is feasible if an enclosure is provided or by using negative aeration.	Material handling using front-end loaders presents a potential safety issue. Requires more initial capital investment than low-technology alternatives such as windrow composting. Moisture addition may be needed to maintain a proper composting environment. More labor intensive due to pile construction.

Agitated-Bin In-Vessel Composting

Agitated-bin composting processes use automated turning machines that travel on tracks on the top of parallel partition walls as shown in Figure A-4. The system uses an array of bins that share turning machines. Each bin measures 6 to 20 feet wide, and the compost depth in the bins can range from 4 to 8 feet. The length of each bin can be varied as needed to provide at least 20 days of composting. After composting is complete, the material is screened and cured. Some pulverizing of the material takes place as the turning machine passes through the compost daily. The turning machines require frequent maintenance since there are a number of moving parts in

contact with the compost and the machinery is exposed to the moist exhaust from active compost. The primary benefits of this system are that it is automated and can be managed in an enclosed facility.

Aspects of agitated-bin composting that are similar to ASP composting include feedstock mixing, screening, odor control, and product storage. However, there are two differences between agitated-bin and ASP composting: (1) when screening takes place and (2) the method of curing. In agitated-bin systems, screening typically occurs immediately after composting to reduce the amount of floor space needed to pile the material. The material is not typically aerated during curing. Instead, curing is completed by piling the screened material on a slab, underneath a canopy where it is protected from weather for approximately 28 days.

Advantages and disadvantages of agitated-bin composting are listed in Table A-4. Figure A-5 provides photographs of the agitated-bin composting facility in Santa Rosa, CA.
Product would be stored on a paved slab with capacity to store 60 days of compost production.

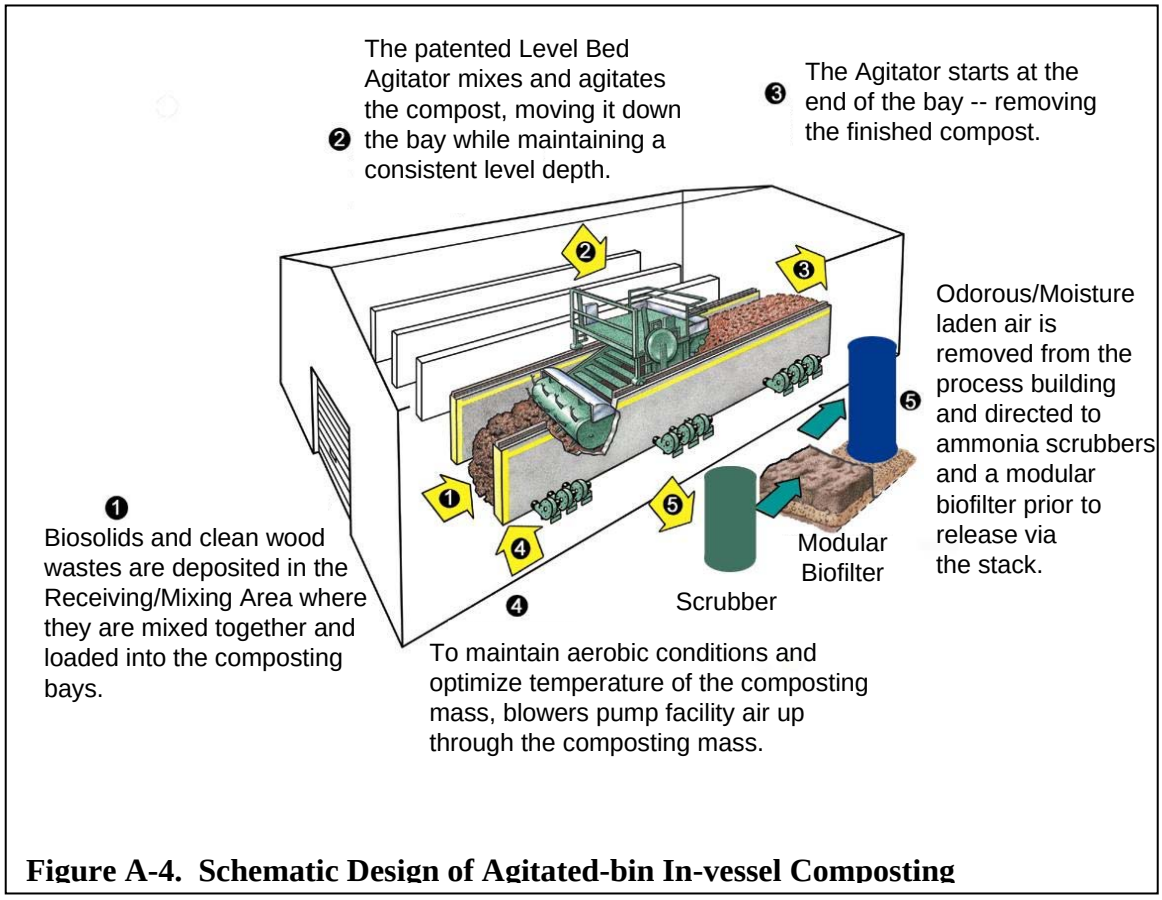

Figure A-4. Schematic Design of Agitated-bin In-vessel Composting

Figure A-5. Pictures of Agitated-bin In-vessel Composting Facility Santa Rosa, CA

Table A-4. Advantages and Disadvantages of Agitated-bin In-vessel Composting

Advantages	Disadvantages
More cost effective compared to windrow composting if an enclosure is needed	System requires use of maintenance-intensive composting equipment.
Process controllability is high because process is enclosed, making temperature, aeration and moisture control easier.	Greater product hauling is required compared to alternatives that reduce volume such as thermal drying and incineration.
Odor containment is feasible if an enclosure is provided.	Material handling using front-end loaders presents a potential safety issue.
	Moisture addition may be needed to maintain a proper composting environment.
	Requires more initial capital investment than low-technology alternatives such as windrow composting.
	May require additional water to maintain moisture.

OPEN-AIR WINDROW COMPOSTING

Windrow composting is one of the most common composting technologies in use today. Its benefits include simple construction and low capital costs. Windrow composting is conducted by placing the mixture of feedstock in long narrow piles (also called windrows) and agitating, or turning the piles on a regular basis. Typical heights of windrows are 3 to 9 feet; windrow widths range from 10 to 20 feet. The optimal size of windrows is a balance between keeping it small enough to maintain aerobic conditions through passive aeration and keeping it large enough to hold heat and achieve temperatures high enough to evaporate moisture and kill pathogens. The equipment to be used for turning, either a bucket loader or a windrow-turning machine, is also a factor in determining windrow heights. Pictures of a typical windrow composting facility are shown in Figure A-6. Advantages and disadvantages of open-air windrow composting are described in Table A-5.

Figure A-6. Pictures of Open-air Windrow Composting Facility
Compost-turning machine (left) and windrow (right). Santa Barbara County

Aeration of the windrows depends on the porosity of the pile and the turning frequency. Windrow composting typically emits strong odors when piles are turned. With each turn of the pile, trapped heat, water vapor, particulate matter, and gases are released to the atmosphere. Therefore, windrow composting is primarily used in rural areas where odors are less

Table A-5. Advantages and Disadvantages of Open-Air Windrow Composting

Advantages	Disadvantages
Relatively low capital costs.	Use of front-end loaders for material handling presents a potential safety issue.
Relatively simple technology to operate and maintain.	The process is labor intensive.
	Large land area is required. System uses shorter compost pile heights and requires equipment aisles, which increase the facility's size and, consequently, material handling costs
	Enclosing a windrow composting facility is usually not economical due to the large area used.
	Greater product hauling is required compared to alternatives that reduce volume such as thermal drying and incineration.
	Outdoor composting operations are impacted by weather, including rainfall, temperature and humidity, which cannot be controlled.
	Strong odors and air pollutants can be emitted, especially during turning.
	Process control is more difficult because aeration and temperature cannot be controlled continuously using mechanical aeration.

Feedstock Mixing

Because dewatered cake is usually too wet, not porous enough, and lacks sufficient biodegradable carbon, it should not be composted alone. Instead, it should be blended with amendment (wood chips, green waste, etc.) and recycled compost or amendment. The amendment is added to act as a source of carbon, increase feed porosity and reduce feed moisture content. The recycled compost or recycled amendment is added to provide active biological seed, increase feed porosity, reduce feed moisture content, and reduce amendment requirements. Processed green waste is a good source of amendment that should be considered if composting is implemented.

Mixing is typically accomplished in a pug-mill mixer that can be stationary or mounted on a truck. Feedstock material can be loaded into the mixer using conveyors or front-end loaders.

Screening

A variety of equipment can be used to screen compost to recover amendments and produce a finished product that is suited for the intended application. Screens can also be used to sort amendments. Use of properly-sized amendments can be important, depending on the type of composting process used. The three primary types of screens are (1) trommels, (2) star screens, and (3) shaker decks. Star screen have the advantage of being able to vary the screen opening size without replacing parts on the machine.

Product Storage

Adequate space for storing finished compost product is needed to handle seasonal variations in demand. Storage also allows the producer to deliver large quantities of material in a short time to customers with large orders, such as landscapers working on new construction projects.